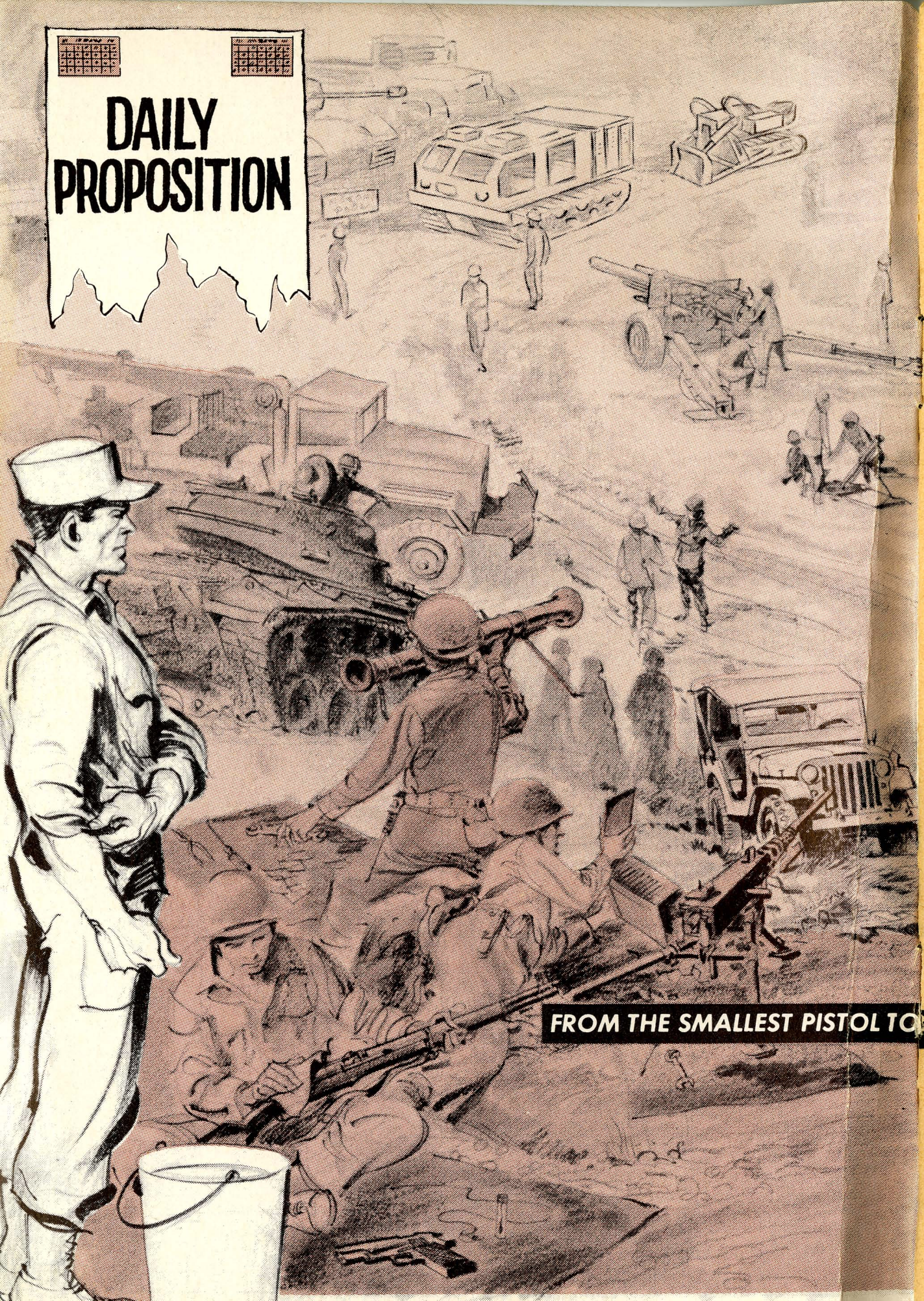
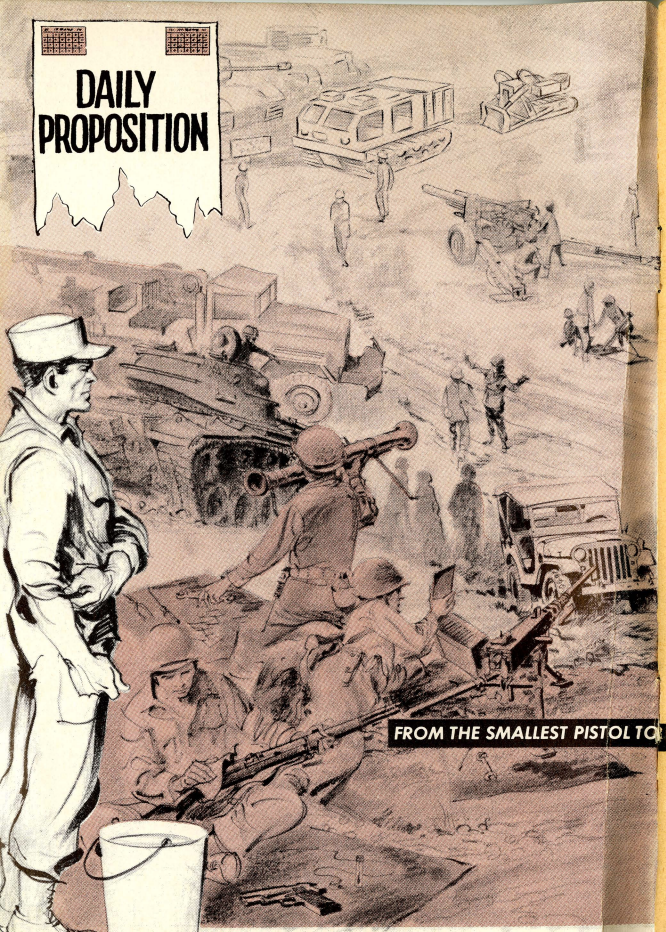
PS

THE PREVENTIVE MAINTENANCE MONTHLY

Issue 29 1955 Series


DAILY PROPOSITION
FROM THE SMALLEST PISTOL TO



Keeping equipment clean is an everyday proposition. It's one maintenance job that never ends, and it's one of the most important. Keeping it clean doesn't mean it has to sparkle all over. But it is important to keep dirt out of those important working parts—large and small. The manufacturers started the ball rolling by providing enclosed compartments, seal and filters to keep the air, fuel and lubricants clean.

Once the equipment's in your hands, you're the one who has to keep it working right. And as long as the safeguards are there, you're way ahead to take advantage of them and keep 'em in good shape. Whether you've got a tank, truck or a heavy piece of Engineer equipment, clean or replace filters regularly. Check your LO's and TM's. Bearings and working parts have to be lubed at the right time and in the right way. You gotta make sure the lubricant is clean and be extra certain dirt doesn't get in it.

Clean fuel is also important. It'll hold down wear and tear on fuel pumps and other parts of the fuel system and engine. Dirty fuel is generally caused by careless handling.

Dirt does the dangerous damage to your equipment. Fight that dirt and your equipment will work longer and better—so will you.

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Issue No. 29 **1955 Series**

Published by the Department of the Army for the information of organizational maintenance and supply personnel. Distribution is made through normal publication channels. Within limitations of availability, older issues may be obtained direct from Preventive Maintenance Office, Raritan Arsenal, Metuchen, New Jersey.

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THE LARGEST TANK AND GUN

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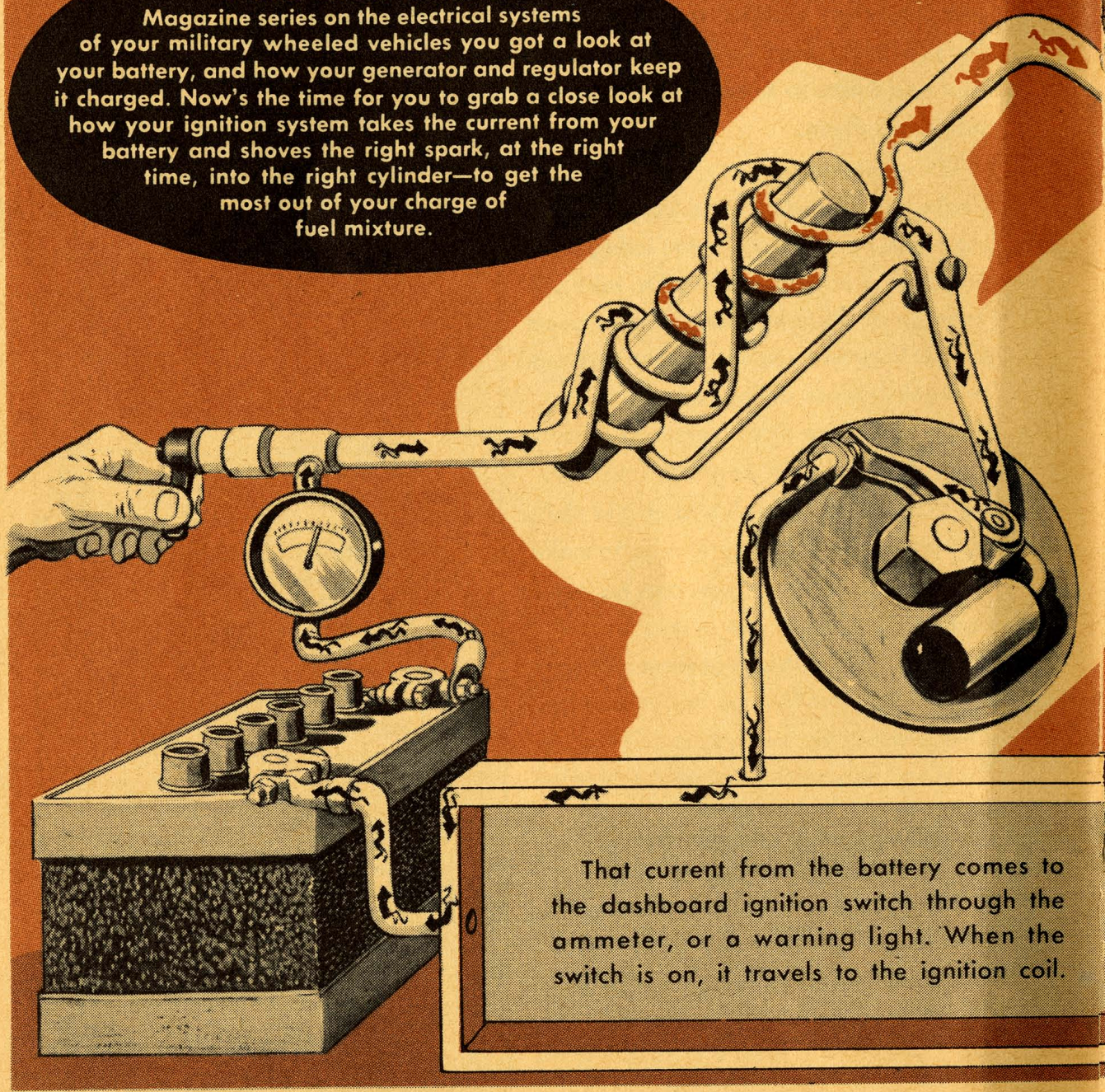
24-VOLT WATERPROOF ELECTRICAL

HOW YOUR ENGINE GETS ITS FIRE WHEN IT NEEDS IT—WHERE IT NEEDS IT

In other articles in this PS Magazine series on the electrical systems of your military wheeled vehicles you got a look at your battery, and how your generator and regulator keep it charged. Now's the time for you to grab a close look at how your ignition system takes the current from your battery and shoves the right spark, at the right time, into the right cylinder—to get the most out of your charge of fuel mixture.



That current from the battery comes to the dashboard ignition switch through the ammeter, or a warning light. When the switch is on, it travels to the ignition coil.

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PART III

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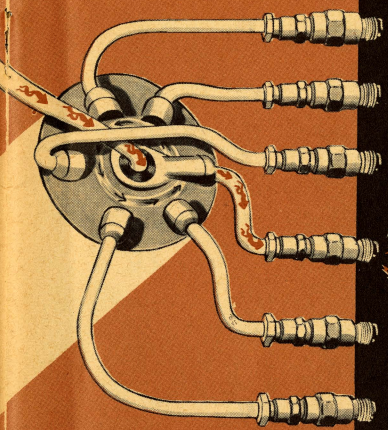

The ignition coil is a sort of gearbox (induction coil if you want to be stuffy) that steps up 6-, 12-, or 24-volt current from the battery to a voltage high enough to jump the gap of your spark plug—anywhere between 4000 and 18,000 volts.

THERE'S NOTHING COLDER THAN THE OLD GIRL WHEN SHE HASN'T GOT THE SPARK. THE ONLY THING THAT'LL GET THINGS JUMPING IS A JOLT OF HOT JUICE IN THE RIGHT PLACE—AND AT THE RIGHT TIME. THAT'S THE JOB OF YOUR VEHICLE'S IGNITION SYSTEM.

SYSTEMS

PART III

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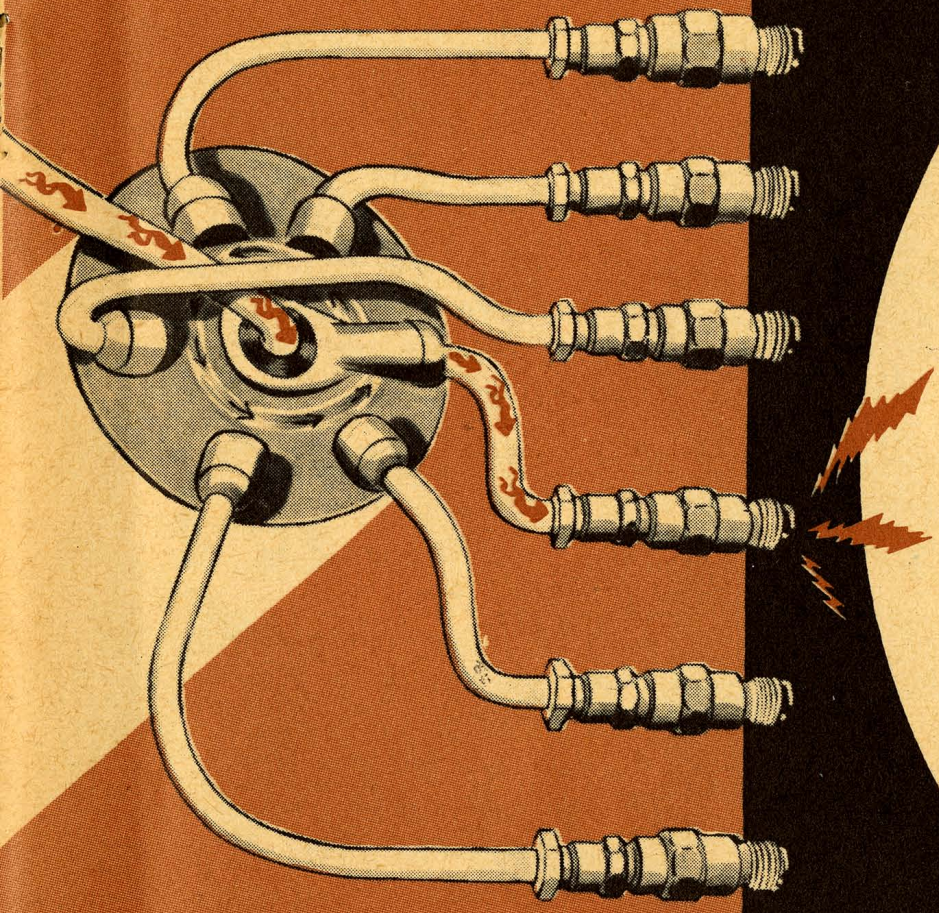

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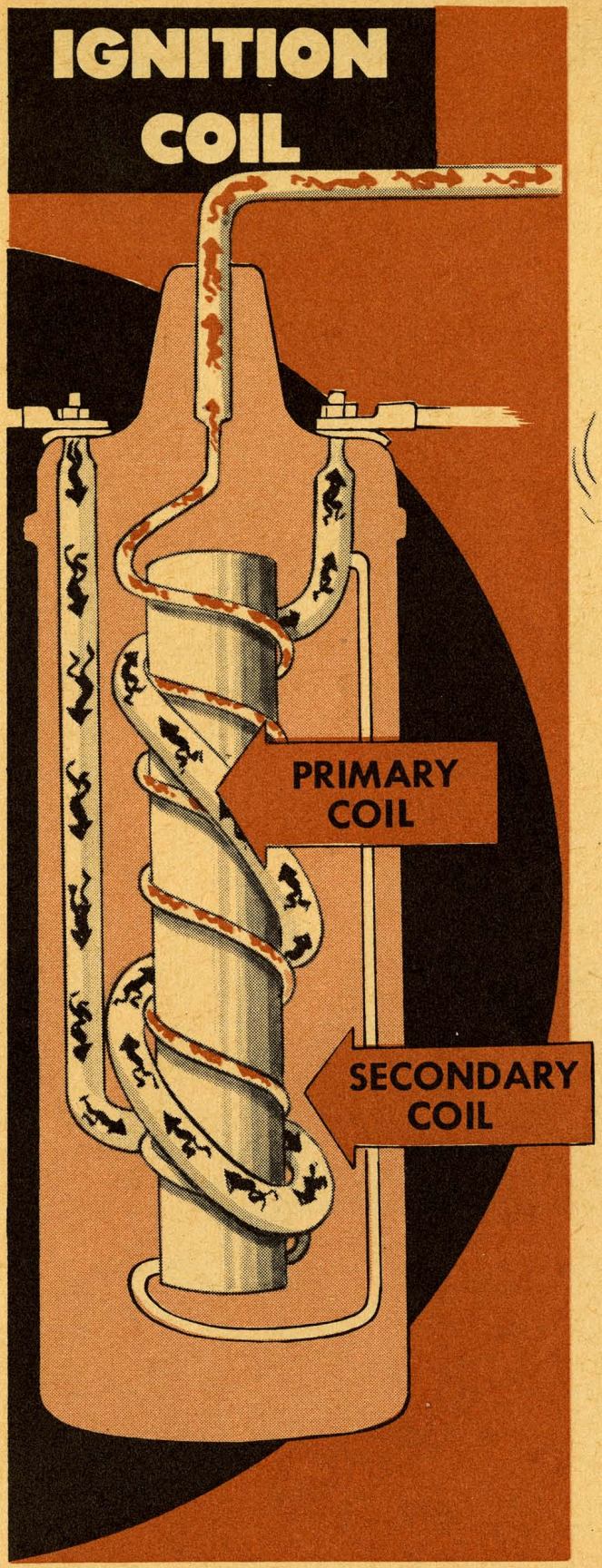
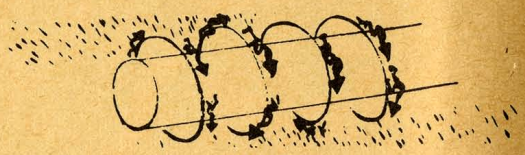


Like you saw on the generator, when it comes to electricity there're three things that go together like Hart, Schaffner & Marx—when you get two of 'em together you're stuck with the third. With electricity, it's a wire, a current, and a magnetic field.

Wave a wire through a magnetic field (or a magnetic field through a wire) and you'll get a current in the wire.



Pass a current through a wire and you'll get a magnetic field set up around it.

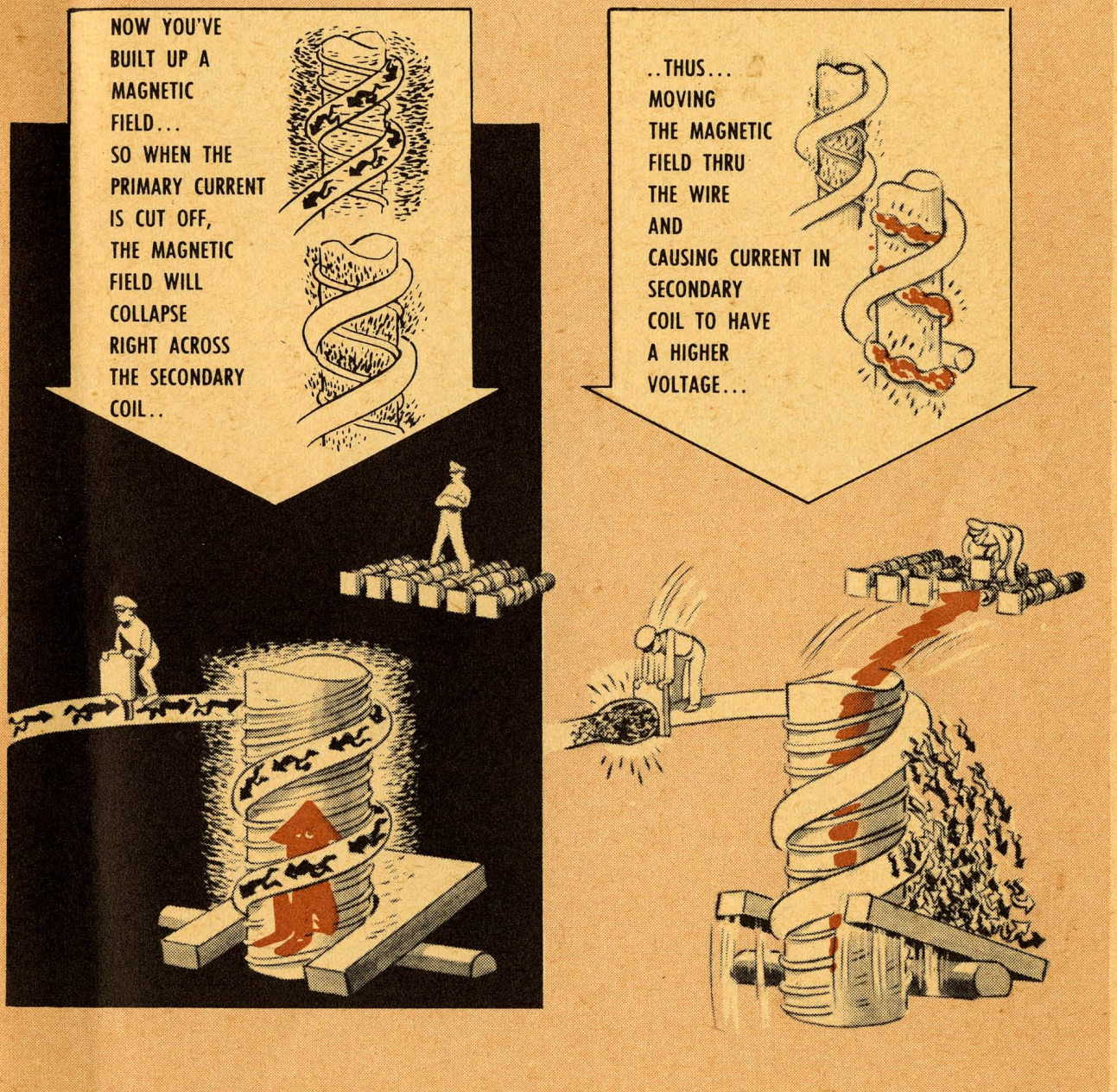
That's the basic idea, and we use it both ways in the ignition coil. Your ignition coil is really **two** coils wrapped around the same core. If it's opened up a little bit just so's you can see how she works, you'll see an iron core with one coil of wire around it—and then another coil completely circling the first one and the core.

That outside coil has a few hundred turns and is called the "primary" because that's where the current hits first.

The inside coil has thousands of turns and is called the "secondary." That's where you get juice after current hits the primary and then leaves it.

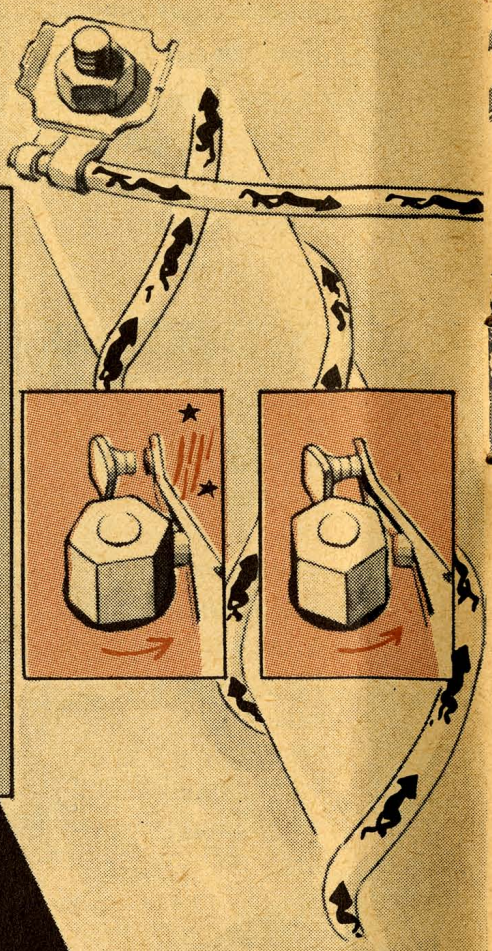
How do you get that? Well, you never get something for nothing, so here in the ignition coil you have to spend a little amperage (total flow) in order to get more voltage (pressure). Sort of a spring-board deal where the primary builds up a good-sized gang of "electrons" and they fling a weight on the spring board, bouncing one or two other electrons high enough to jump the spark plug gap. You sacrifice the gang in order to bounce a few up real high.

IT WORKS LIKE THIS...



All this doesn't happen when you put the current **in** the primary coil. It happens when you cut **off** the current going through the primary which in turn collapses the field. So what we need now is some way to break down this primary current at just the right fraction of a second when you need to fire the plug.

The current flows through the primary, across the points, to ground. The points open and close, turning on and off the current that goes into the primary. While they're doing this, there's a danger of the points arcing (sparking) and this would weaken your secondary current—the one that goes to the engine. Why? Because the magnetic field wouldn't collapse until after the points got far enough apart for the sparking to stop.



CONDENSER

How to stop the sparking points? That's the question. Well, that sparking happens because the same magnetic field collapsing around the secondary also creates (induces) a current in its own primary coil. It's this self-induced current from the primary that's sparking the points.

You solve the problem right quick with a handy little gadget called a condenser (or capacitor). It's used to play a dirty trick on the self-induced current. It's hooked up across the points so that to the current it looks like a short-cut detour, only it turns out to be a dead-end street. But by the time the current finds that out, stops, and backs out, the points are already open—the spark plug has already fired—and it's too late for sparks.

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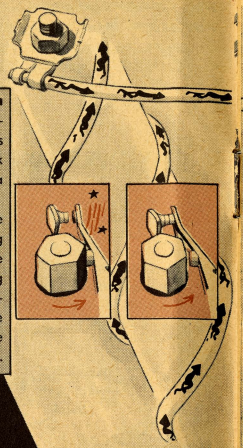

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The gimmick that "shoots" the current at the exact instant when y'need to fire a particular plug is the **breaker** points which are opened when the high point of the cam hits the fibre cam follower on movable contact point.

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CONDENSER CONSTRUCTION
INSULATING PAPER
ALUMINUM
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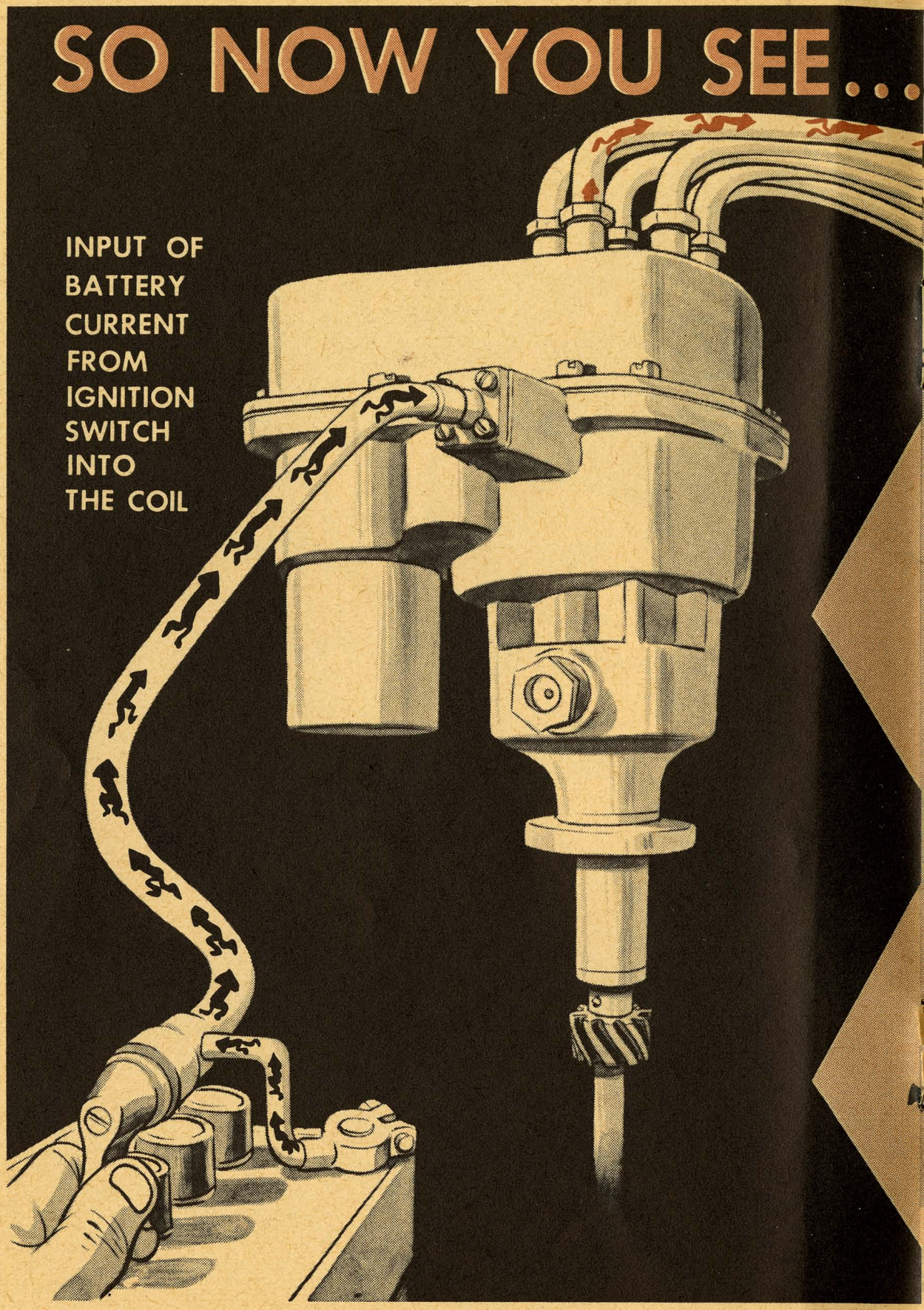
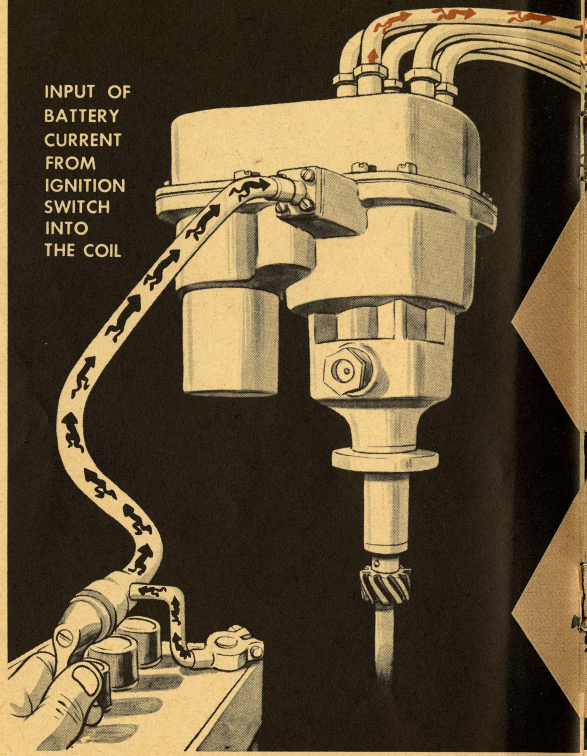
SO NOW YOU SEE...



SO NOW YOU SEE...

INPUT OF BATTERY CURRENT FROM IGNITION SWITCH INTO THE COIL



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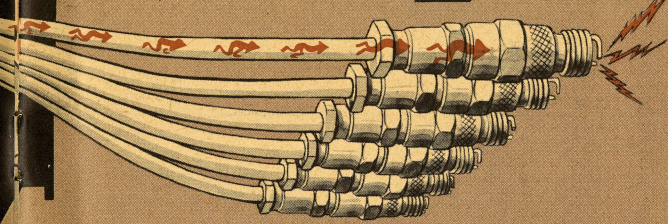
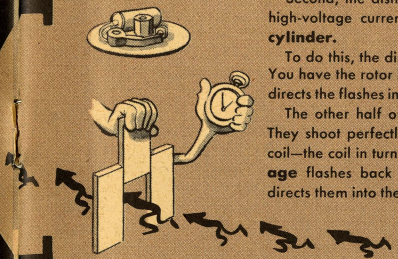


First, it has to shoot current to the coil, on-and-off, on-and-off, so that the coil will give off **perfectly timed** flashes of high-voltage juice—like you've just seen.

Second, the distributor has to take these flashes of high-voltage current and direct them into the **right cylinder.**

To do this, the distributor is sort of a two-man team. You have the rotor in the top—it's like a traffic cop that directs the flashes into the one cylinder that's to be fired.

The other half of the team is your breaker points. They shoot perfectly timed flashes of current into the coil—the coil in turn shoots perfectly timed **high voltage** flashes back to your traffic-cop rotor, and he directs them into the right cylinder.



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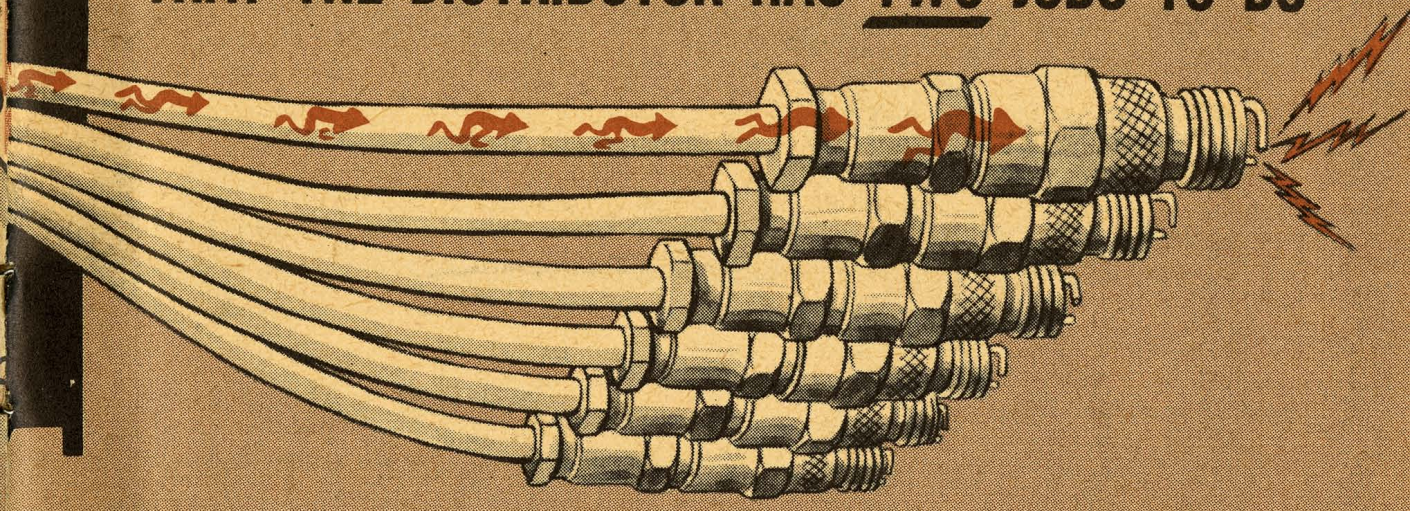

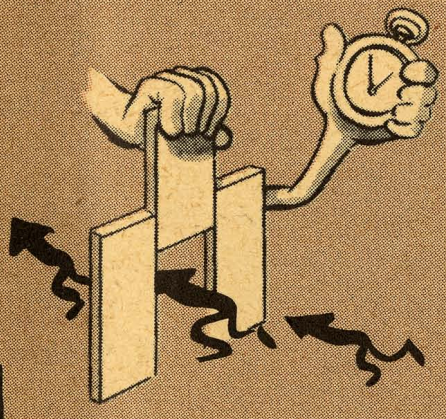

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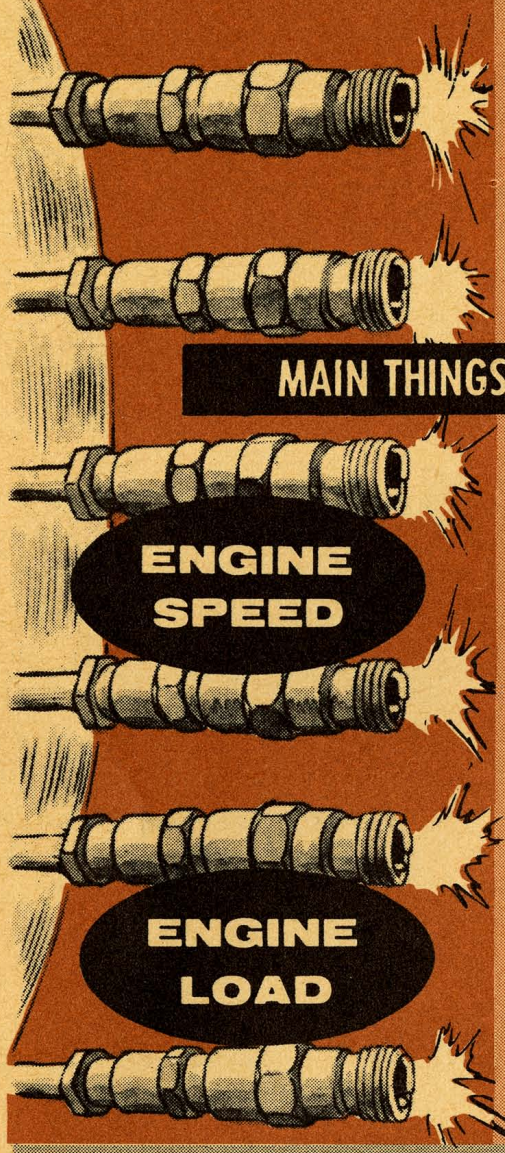

Tests show that the time you want to fire your charge is just before the piston gets to the top of the compression stroke. Just how long before (advance) the top of the stroke depends on several different things, though, and that's where the deal gets complicated.

MAIN THINGS TO BE CONSIDERED IN DECIDING HOW MUCH

As a rule, when your engine goes faster you want more spark-advance—more speed, more advance. This is needed because when your compressed gas-load is fired in the cylinder, it takes a little time for the flame to spread across the face of the piston. You need to have your fire burning good and delivering maximum push just as the piston is starting to go down.

Just how fast your compressed gas-load burns in the cylinder depends on how much it has been compressed—or squeezed—by the cylinder on its way up. When you first look at it, you would think this would be the same all the time, but it isn't.

Here's what makes the difference. As your engine pulls harder, you open your throttle wider. When you open your throttle wider, you increase the pressure of the fuel-air mix you're putting into the cylinder. This happens because the open throttle lets the intake-manifold vacuum approach the pressure of the outside air. And when you increase the pressure of your charge, you want to hold off firing (retard) until the piston is pretty close to the top of its compression stroke. (This helps prevent that "ping" which comes from detonation—when the whole charge blows at once instead of burning evenly.)

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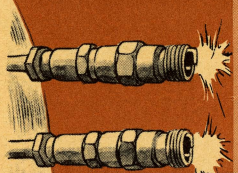

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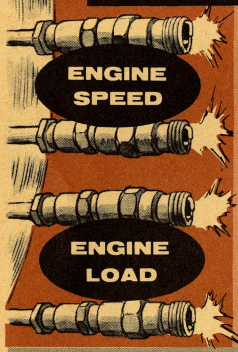

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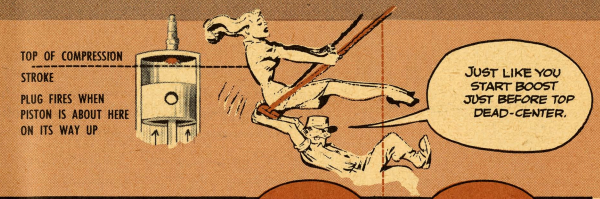
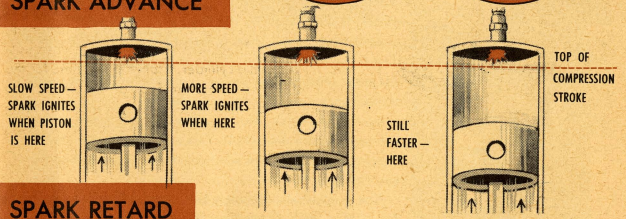
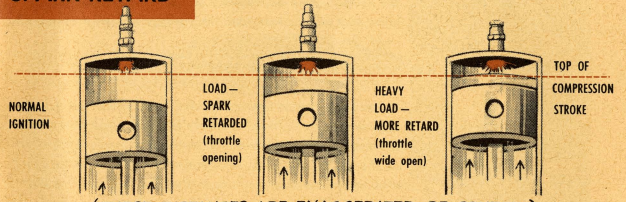


SPARK ADVANCE OR RETARD ARE ENGINE SPEED AND ENGINE LOAD

SPARK ADVANCE



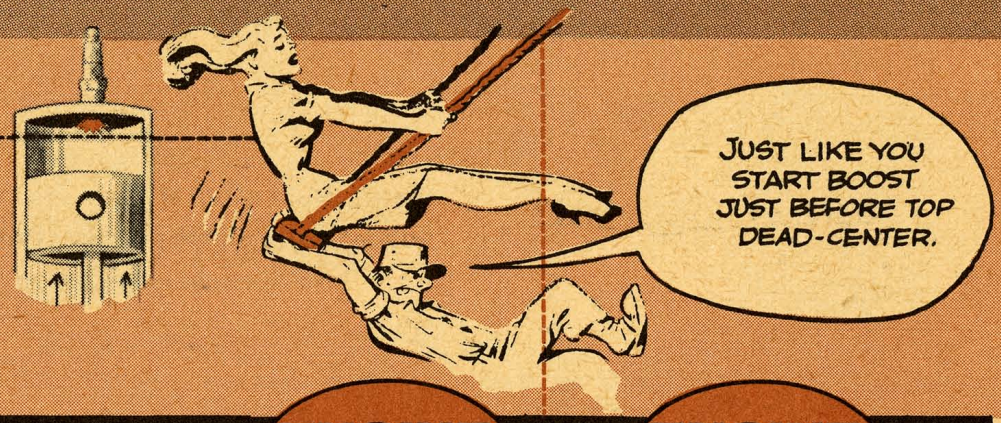
SPARK RETARD



(THESE DISTANCES ARE EXAGGERATED, OF COURSE.)

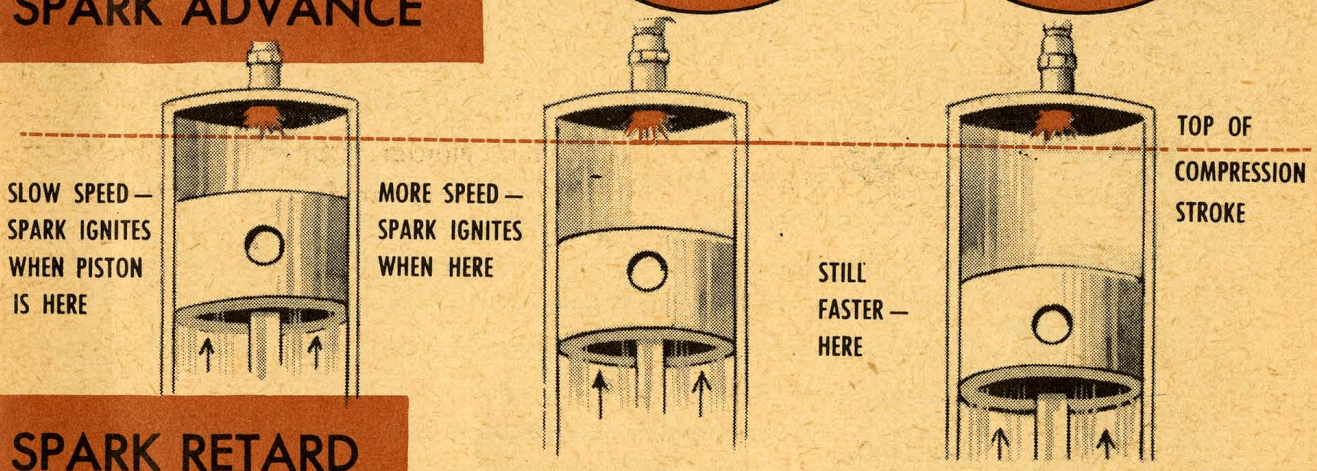
SO YOU SEE THE FASTER THE SPEED, THE MORE YOU WANT TO ADVANCE THE SPARK . . . THE WIDER THE THROTTLE, THE MORE YOU WANT TO RETARD THE SPARK.

GETS THE BEST POWER OUTPUT FROM THE ENGINE

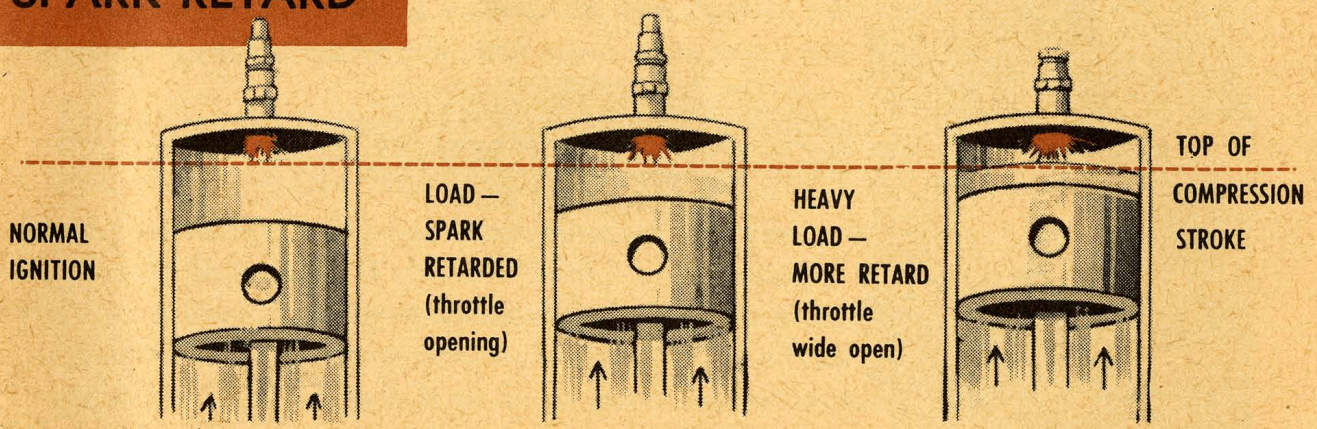


SPARK ADVANCE OR RETARD ARE ENGINE SPEED AND ENGINE LOAD

SPARK ADVANCE

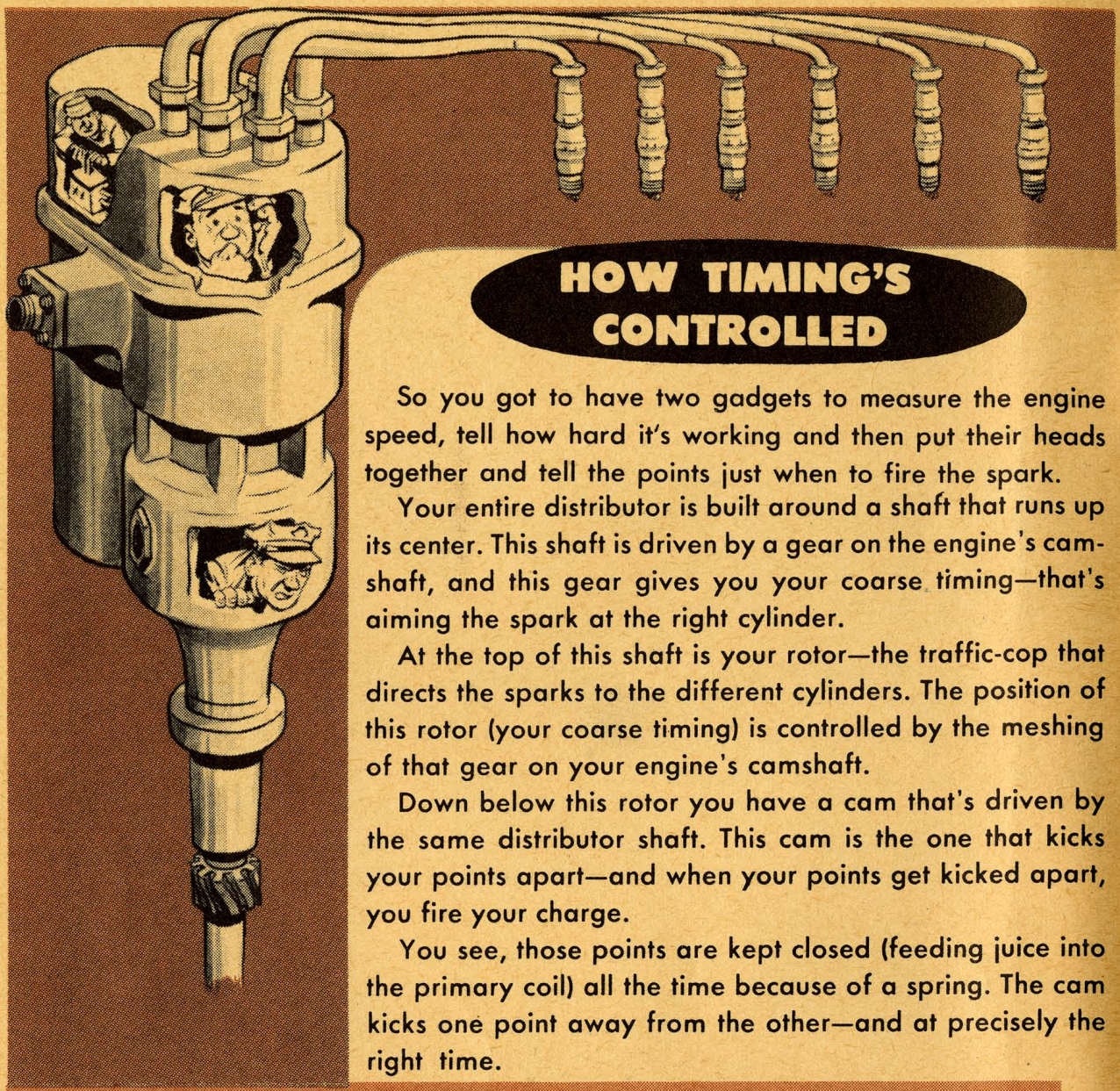


SPARK RETARD



(THESE DISTANCES ARE EXAGGERATED, OF COURSE.)

SO YOU SEE THE FASTER THE SPEED, THE MORE YOU WANT TO ADVANCE THE SPARK . . . THE WIDER THE THROTTLE, THE MORE YOU WANT TO RETARD THE SPARK.



HOW TIMING'S CONTROLLED

So you got to have two gadgets to measure the engine speed, tell how hard it's working and then put their heads together and tell the points just when to fire the spark.

Your entire distributor is built around a shaft that runs up its center. This shaft is driven by a gear on the engine's camshaft, and this gear gives you your coarse timing—that's aiming the spark at the right cylinder.

At the top of this shaft is your rotor—the traffic-cop that directs the sparks to the different cylinders. The position of this rotor (your coarse timing) is controlled by the meshing of that gear on your engine's camshaft.

Down below this rotor you have a cam that's driven by the same distributor shaft. This cam is the one that kicks your points apart—and when your points get kicked apart, you fire your charge.

You see, those points are kept closed (feeding juice into the primary coil) all the time because of a spring. The cam kicks one point away from the other—and at precisely the right time.

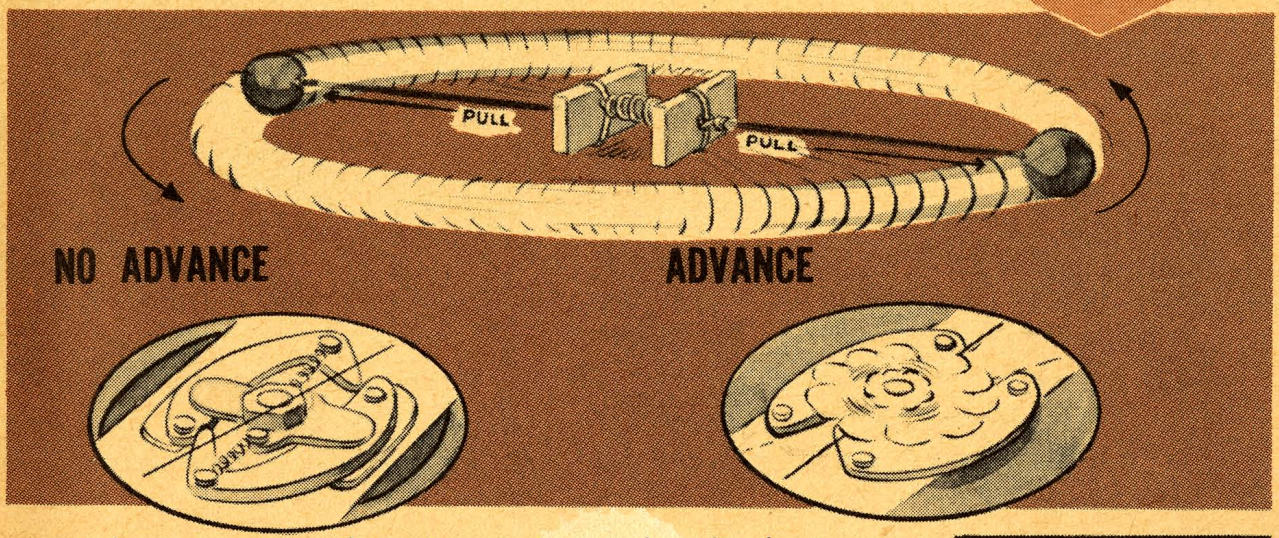
THERE ARE TWO WAYS TO CONTROL TIMING...

Since the coarse timing is determined by the gear on the engine-camshaft, there are only two ways you can change the instant of fire: Change the position of the cam as it rides on the distributor shaft, or change the position of the points around the distributor shaft so that the cam hits the points sooner—or later.

Actually your distributor does both. Up in the distributor body is a set of flyweights held in by springs. These springs control the setting of the cam on the distributor shaft. As the engine speeds up, these weights swing outward (centrifugal

force) and rotate the cam **forward** around the distributor shaft so that the spark **advances.** This advance varies from **none** at **idle speeds** all the way to **full advance** at the engine's **top speeds.**

ACTUALLY HERE'S HOW

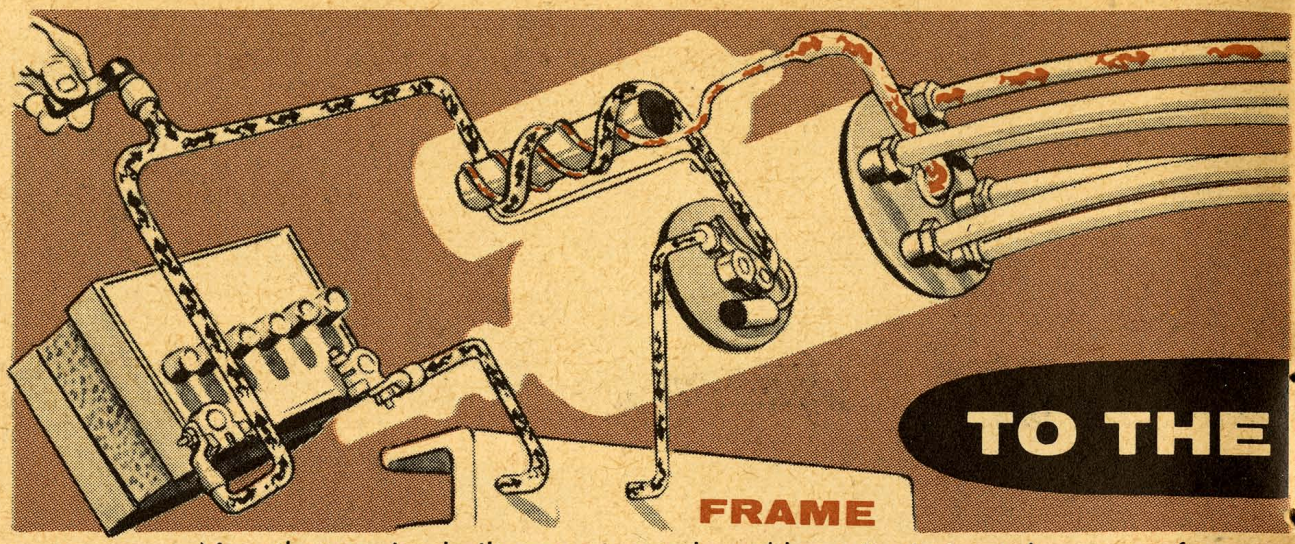


At the same time, there is a spring and a diaphragm mounted on the side of the distributor housing. This diaphragm is connected to the intake manifold. The spring rotates the plate that the points are on, around the distributor shaft, so that the cam kicks the points apart sooner—or later—depending on the intake vacuum. At normal road load you have a high vacuum, so the spark is **advanced.** When you jam your big feet down on the throttle, opening it full, you have practically no vacuum so the diaphragm turns the points loose and the spring moves 'em back so that they **retard** the spark. (In your M-series vehicle, you'll find only the centrifugal flyweight spark advance—no vacuum advance.)

COMBINATIONS

So you can see these two gadgets between them can cover the whole range of engine speeds and loads. When you're taking off, with slow engine speed and open throttle (low vacuum), they work together to retard your spark way back. When you're running at a pretty good clip but with a half-closed throttle, they work together to give you full advance. But when your engine is running fast and you suddenly open the throttle full, like at the foot of a hill, then the "centrifugal advance" and the "vacuum advance" sorta split the difference to give you just the degree of spark advance you need.

In that last case, the flyweights stay advanced, because the engine is going fast, but due to the drop in engine vacuum the diaphragm retards.

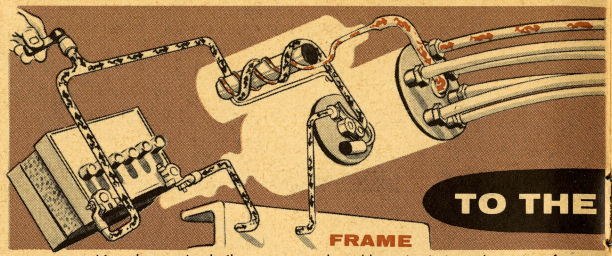


Now that you've built up your spark and have its timing taken care of, you have to worry about getting it over to the cylinder. Most of the wiring you have seen (primary wiring) just carries battery voltage and so is thinly insulated, No. 14 or 16 wire, and connected by terminals or screw-type binding posts.

Your high-tension (secondary) wiring has to carry high-tension spark currents, though, so it has lighter wire, heavier insulation, and is equipped with push-in connectors on the ignition coil and distributor cap. These wires run from the center terminal of the coil to the center of the distributor cap—and from the side terminals of the distributor cap to the spark plugs.

Spark plugs are much cussed and discussed, but seldom understood and appreciated. Actually, the little rascals have an awful job to do, and do it very well. They have to carry currents of thousands of volts—without leaking or shorting. They must seal in explosion pressures up to about 400-P.S.I. At the same time, they must operate all day in temperatures as high as 1500° F and fire up to 60 times a second.

Spark plugs usually are made of a center wire, called an electrode, which carries the current into the cylinder; an insulator, generally porcelain, which



TO THE CYLINDERS

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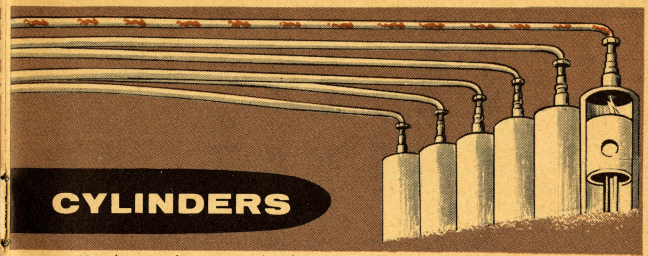


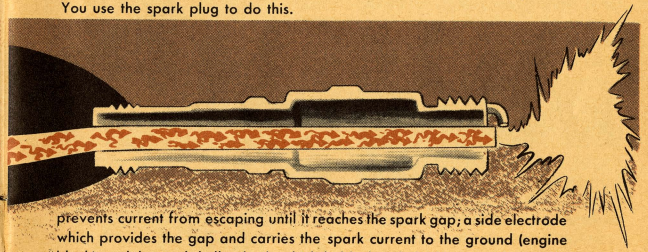
You then see these two paths of current working to explode the gas in the cylinder.

Your battery (primary) current: Battery to key (or switch)—key to primary coil—primary coil to points—then from points to ground.

Your high-tension (secondary) voltage meanwhile moves from the secondary coil to carbon brush in center of rotor—carbon brush to rotor tip—rotor tip to side terminal—side terminal to the correct cylinder.

Now that you've got a hot enough current to fire the charge, and sent it to the right cylinder at the right time, you've got to get it inside that cylinder. You use the spark plug to do this.

AND LAST BUT NOT LEAST SPARK PLUGS



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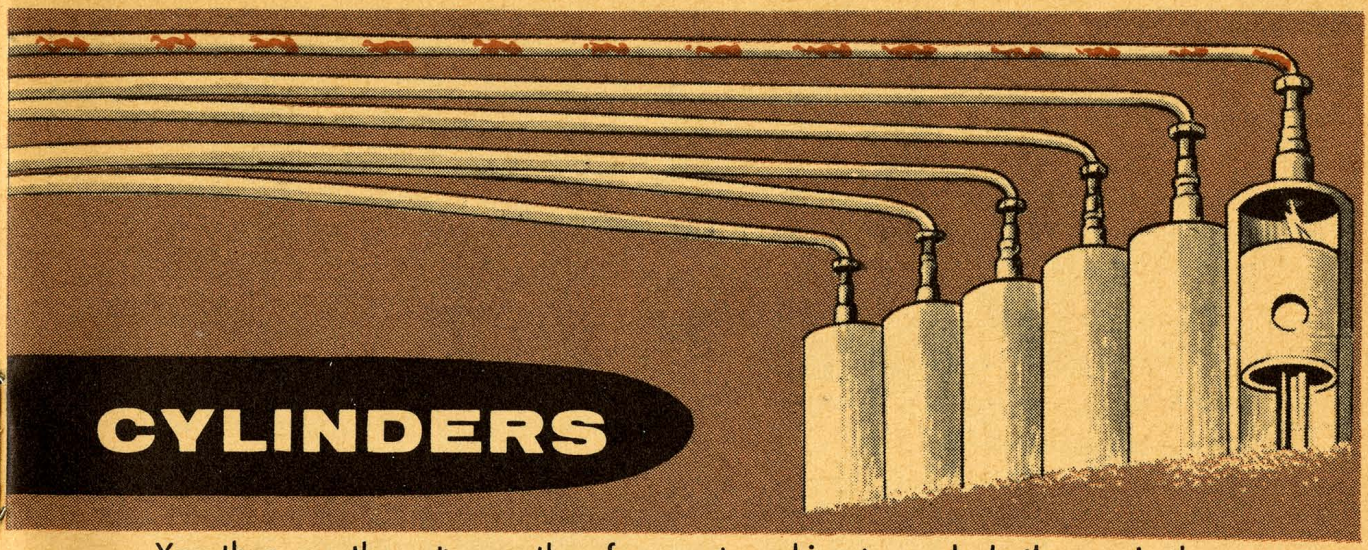
Spark plugs usually are made of a center wire, called an electrode, which carries the current into the cylinder; an insulator, generally porcelain, which prevents current from escaping until it reaches the spark gap; a side electrode which provides the gap and carries the spark current to the ground (engine block); and the steel shell or body which holds the whole thing together and is threaded to screw into the cylinder.

When the spark jumps that gap on your spark plug (and that gap has to be just right) your compressed gas-load fires and another piston is blasted downward on its way to delivering power to your chug-buggy.

This is how your ignition works. Other articles in this series will tell you how to keep it working.



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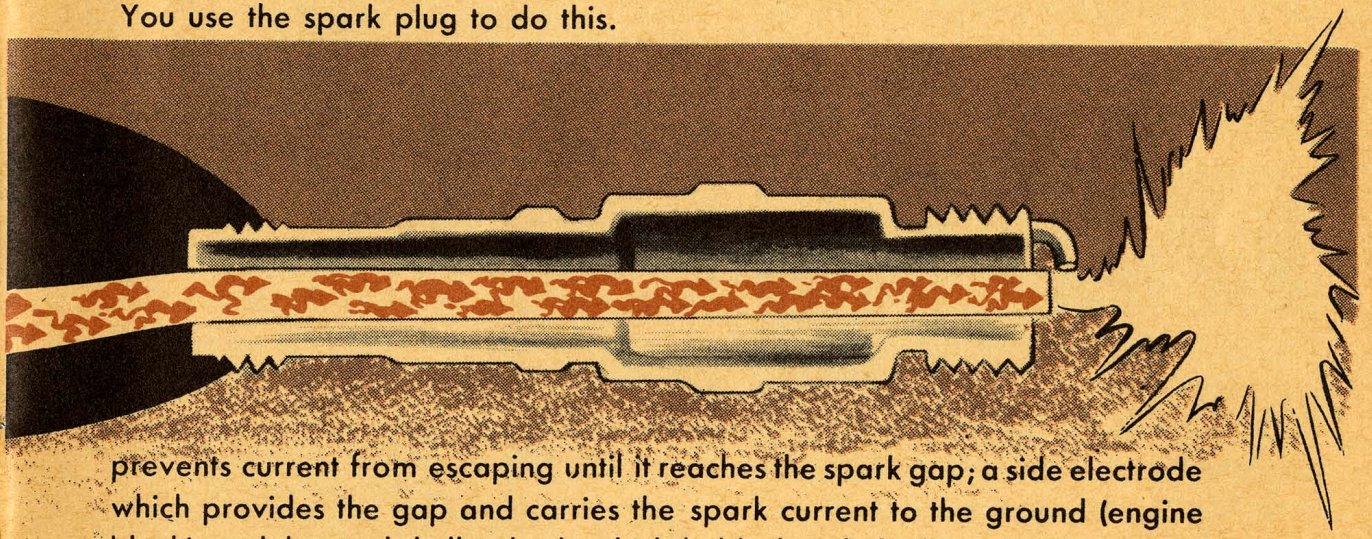

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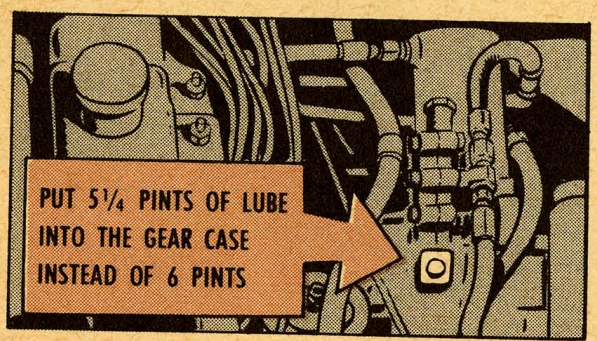
Connie Rodd's "SHORT 'N SWEET DEPT"

Lube line

When it comes to the lube level in your 5-ton, 6x6, truck's steering-gear case, you've got a-case-and-a-half.

The way it's done now, the gear case is brim full of oil—which is more than these parts can take. Sooner or later they leak.

But just because there's a slow leak at that high point doesn't mean it can hurt anything. With a lube leak up there, you still have enough left for the gears to whirl without grinding. Stay off deadline with that type of leak. Leaks lower down are the serious ones.

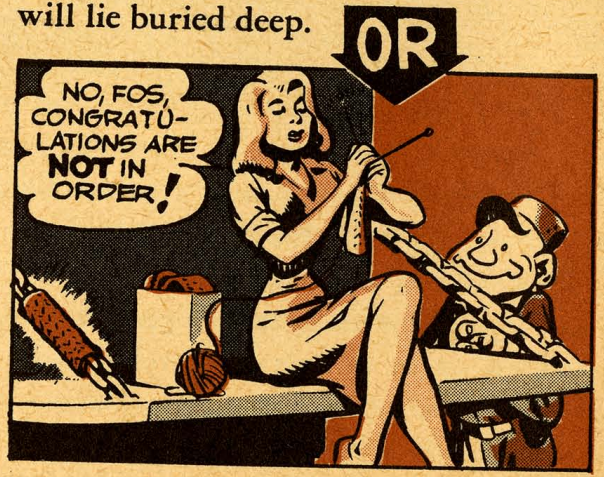


Recent experience shows there has been too much lube put in the case. Instead of 6 pints, put only 5-1/4 pints in the gear case. This should check in at 1 inch below the filler plug. So from now on, make that your level. This change will appear in later TM's and LO's.

And speaking of leaks around the steering gear—watch for one at the gasket between the steering-gear housing and the housing control. It could be you aren't putting enough muscle into tightening the steering-gear-case's mounting bolts. Besides causing a leak, with loose bolts the movement of the case can crack the control housing. Torque those bolts 28 to 33 ft-lbs to steer clear of trouble.

Racking tail

The rattle and clang of chains are soon hushed when smothered in canvas. Rubber tailgate chain-covers, like you find on the M37, 3/4-tonners, will tear. When yours do, scrap canvas is a good replacement. Stitch those open-toe socks by hand or machine, and the sounds will lie buried deep.

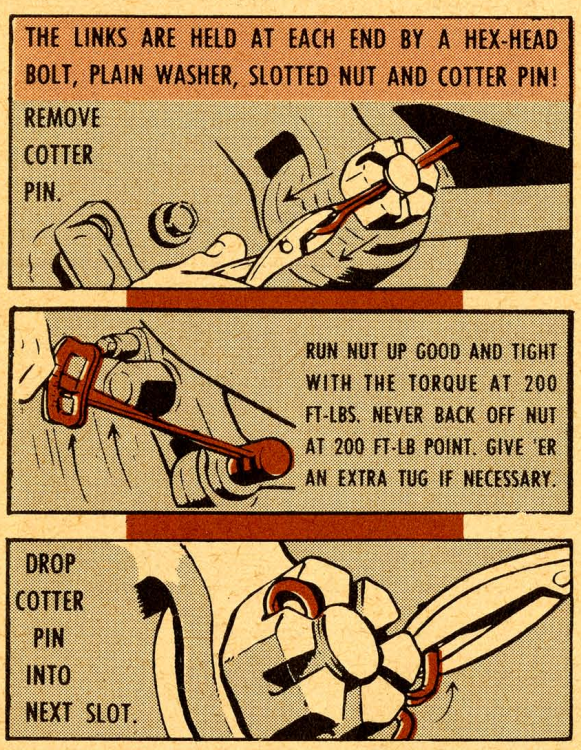


No loose links, please

You light-tank fellas—M41, M41A1 and M42—heave to and lend an ear.

The connecting links that tie your front-roadwheel supporting arms to the compensator adjusting-arms need checking. You gotta keep 'em tight, or the assemblies wear out fast.

You'll be seeing this in the TM's.



Weekly exercise

Be sure you shift your Reo truck into LOW RANGE at least once a week. You don't have to go far—a couple of feet will do.

The high and low range gears of the transfer are mounted on the input shaft on two ball bearings for each gear. Whichever gear you are using is locked to the shaft by the sliding synchronizer assembly, so that gear and the shaft turn as one unit.

While this is happening the ball bearings for that one gear do not turn, and if you operate day after day in that range, they will batter the balls into the races (brinelling, they call it) and howl like a banshee when you finally do go to the other range.

By making a shift once a week, you turn the bearings, so the balls don't sit in one place, and you also force new oil up into the bearings and clean out any sludge that may be there.

Of course, this works both ways. If you have a lot of LOW RANGE driving to do, shift to HIGH RANGE at least once a week for the same reason.

This scoop, which applies only to vehicles being used, is gonna be included in a change to TM 9-819, which'll supersede TB 9-819-20 (23 Sept 53).

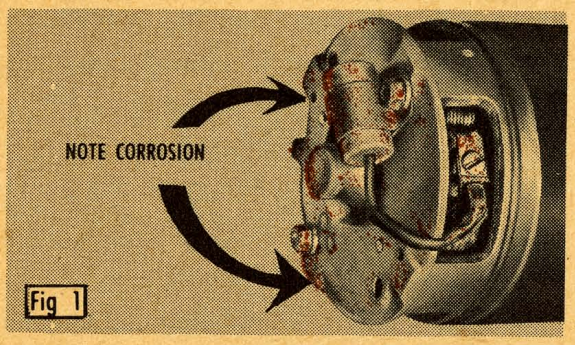
Big feet

Every time some people open their mouth they put their foot in it. But what's worse, every time some people open their tank engine-compartment, they put both their big feet in it. Which does the throttle rods and the air induction system no good. Not to mention other parts they stomp on.

This wouldn't be you, of course, but just in case someone who thinks with his feet should get into your pet buggy, why not stencil "NO STEP" on the metal air ducts?

Wanna start somethin'?

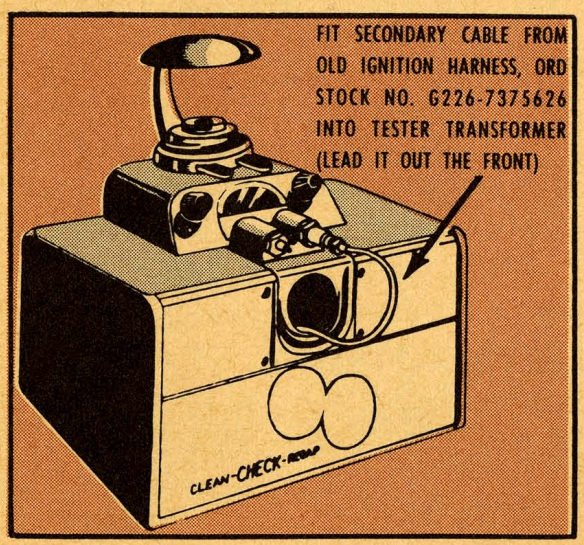
This sore spot (Fig 1) was uncovered under a 2-1/2-ton truck's starter cap-cover. The cover was wobbly. Condensation and corrosion snuck in. Soon—no starts—only stops. Shows the cover's gotta be tight or all that'll start is trouble.



Hot lead

Some of the boys report that their AC Model A spark-plug tester, Ord Stock No. 40-C-1013, is fouling up when they use it on the shielded spark plugs of the M-series buggies.

Seems the li'l bakelite gismo that carries the test current to the plug can't take it stretched way out to get over the tall plug.



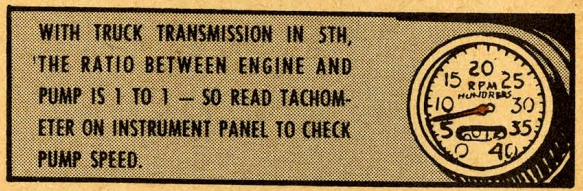
Typewriter read wrong

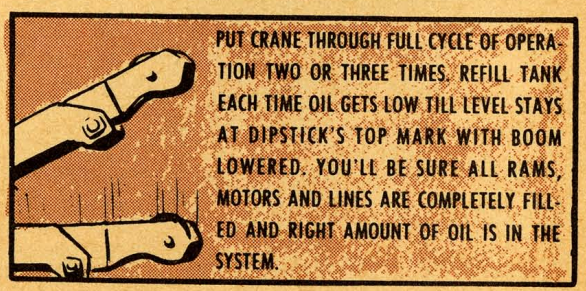
In case you missed it, note 5 of LO 9-819A for the M135 truck, got its differential and transfer gears caught in the transmission's blurb. So stick to TM 9-819A, page 70, for the gear cases such as transfer cases and differentials. Like it says, bring its lube up to plug level when the oil's hot, and 1/2 inch below that level when it's cold.

If these cases are filled to plug level when cold, the oil will expand when it gets hot and you'll get gigged for an overfilled gear case.

You'll see this dope 'fore long in LO 9-8024 (for the Hydra-Matics).

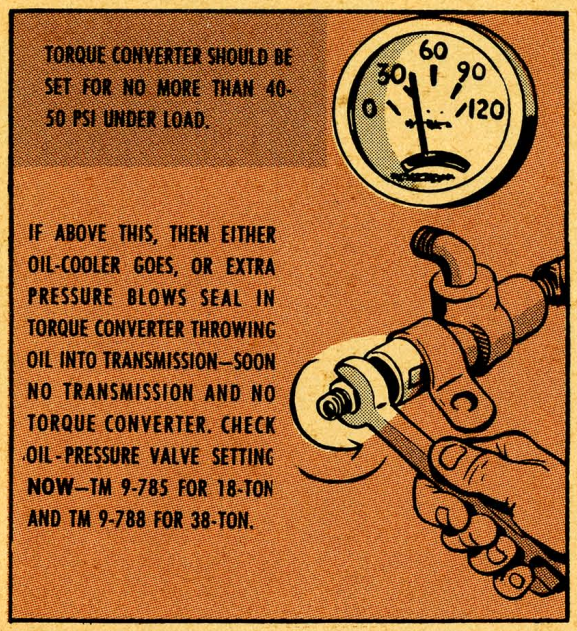
Here's how—





What's your hurry?

You guys who drive the big jobs . . . like the M4, 18-ton tractor, used with the 90-mm antiaircrafts and 155-mm long-toms . . . or the M6, 38-ton tractor, used with the 120-mm and 8-inch guns, and 240-mm howitzers.



Should you see your converter's oil-pressure gage on the instrument panel read above 50-PSI, you're heading for trouble. You'll soon be deadlined like a dead duck. And after all, you're better off with a slower, sure get-away than none at all. So pick up speed easy-like.

Fuel-filter flush

The M42 twin 40 is getting a new valve and hose set-up for the main engine fuel-filter. Drains 'er right through the transmission access opening—no muss, no fuss, no bother.

But that's no cue for the rest of you light-tank-family fellas (M41, M41A1, M75, M8E2, M44) to lean back with your finger in your ear and wait for the same deal. Might be a long wait. And those filters need attention every time you take your buggy for a whirl. **'Specially in rough going—like desert, jungle or arctic operations.**

Here's why: Let a fuel-filter element get plugged up a little and it reduces fuel flow to the carburetors and lowers the gas level in the carburetor float-bowls; this starves the engine and leaves an explosive mixture in the bowls; and should you get a backfire as the fuel mixture leans out, it's likely to smash into the float bowls and squash your floats.

So-o-o—before y'tuck the ol' gal in for the night, drain that bowl. Let about a pint of gas run through to give it a good flushing. (If the M42's remote drain seems slow and stopped up, take out the drain plug and run a wire through to loosen the crud. Make sure it's long enough to reach all the way to the filter.)

Except on the modified M42, you work through the engine compartment. Catch the drainings in a quart can or some such container—**not** in the compartment bilge.

But if you ever accidentally spill gas in the bilge—lay off that bilge pump until you're sure your right exhaust muffler is cool. The pump's outlet is right next to this muffler, and if she's near operating temperature you'll ignite the spilled gas for sure.

Flushing a fuel filter's one thing; cleaning it's another. All filters should be disassembled and cleaned up at least once a month—like your TM says.

Busted troop seats

Broken slats on truck troop seats can result from stuck or rusted legs. If one or more legs fail to come down when you put the seats down, the weight of the men will mebby bust the slats.

Stop...don't bust

The guys who shove their trucks into reverse before they stop are just asking for busted-up transmissions. On any truck, bring her to a halt—then shift to reverse.

HERE'S A LIST OF ADDITIONAL OFFICIAL PUBLICATIONS ON ORDNANCE EQUIPMENT WHICH ARE OF INTEREST TO A LOT OF YOU.

SNL's

Ord 8 SNL A-29 (TO 11W2-5-10-4), Gun, auto, 37-mm, M1A2; Mt, combo. gun, M54; and sight, ring (7686254), Sep 54

Ord 9 SNL A-91 (TO 11W1-13-4-14), Gun, auto, .60-cal., T130E3; gun, auto, 20-mm, T160E3; gun, auto, .60-cal., M38 (T130E4); gun, auto, 20-mm, M39 (T160E4) and M39A1, Sep 54

Ord 8 SNL D-47 (TO 11W2-8-8-4), Mount, gun, combo, M73, Sep 54

Ord 7 SNL D-48, Gun, auto, 75-mm, T83E6 and T83E7; recoil mech, T47E2 and T47E3; ldr-rmmr, T23; mt, gun, AA, 75-mm, T69 (incl FCS T38), Sep 54

Ord 9 SNL D-66, Trlr, 762-mm rkt, XM329; kit, heat and tie-down, 762-mm rkt, XM46; blanket, elec, 762-mm rkt, XM1, Sep 54

Ord 8 SNL F-167, Director, AA, M7A1B1, Oct 54

Ord 9 SNL F-350, Vol 1, FCS T38, vol 1, list svc parts, computer, T27E2, Sep 54

Ord 9 SNL F-350, Vol 2, FCS T38, tracker, radar, T9, Sep 54

Ord 9 SNL F-356, Sec 2, Range finder, T42E1, Sep 54

Ord 8 SNL F-359, Sec 2, Ballistic drive, T24, T24E1, T24E2, Oct 54

Ord 7 SNL G-256, T43E1 tank, 120-mm gun, Sep 54

Ord 7-8 SNL J-245 (TO 32B4-2-2-4), Sander, elec: disk type, 7-in min diam disk, 115-v, ac, dc (Black & Decker Mod R) (5130-256-3647), Oct 54

Ord 7-8 SNL J-722, Grind mach, util: bench, ½-hp, 110-v, 7x1-in, (Baldor Electric, Mod 153C-7") (3425-223-2023), Oct 54

Ord 7-8 SNL J-726 (TO 34Y4-1-124), Container, paint, press feed, 2-gal (DeVilbiss Mod P-QM5504) (40-C-1142), Oct 54

Ord 3 SNL K-1, Cleaners, pres, lubes, recoil flds, spec oils, related maint, mtrls, Oct 54

Ord 3 SNL S-3, Fin assy, and misc inert comp for aircraft bombs, Sep 54

TM's

9-1985-2 (TO 39B-1A-9), German expl ord (bombs, fuzes, rkts, land mines, gren, igniters), Mar 53

9-1985-3 (TO 39B-1A-10), German expl ord (projectiles, proj fuzes), Mar 53

9-1985-4 (TO 39B-1A-11), Japanese expl ord (bombs, bomb fuzes, land mines, gren, firing dev, sabo devices), Mar 53

9-1985-5 (TO 39B-1A-12), Japanese expl ord (army and navy ammo), Mar 53

9-1985-6 (TO 39B-1A-8), Italian, French expl ord, Mar 53

9-6081-5, Gen maint proced and removal install, aline and final inspect of FCS T38, Aug 54

9-7012, M48 Tank, Aug 54

9-8607 (TO 19-75CAK-7), Steer gears (Saginaw Gear Div Gen Mtrs Corp), Sep 54

9-8816 (TO 19-75AFB-35), 37-pass 4x2 integ bus (South Coach Mod S-36-M), Sep 54

9-9049-1 (TO 17-5BFB-50), Floor grind, wheel size 12x2-in, 220-v, 3-hp, ped-type (Brown-Brockmeyer Mod MSG 69-ES7001) (40-G-107-50), Sep 54

9-9103-1 (TO 17-5BFB-86), 115-v univ-curr armature mica undercutter (Allen Elec & Equip Mod E-159) (40-U-300), Oct 54

ORD MWO's

F235-W18, Periscope T25: cement gasket, **D,** Oct 54

G788-W5, 4x2 36-pass integ bus (Twin-Coach, Mod F-32-F): improve lubr of camshaft-sprocket-hub needle-bearing, **D,** Oct 54

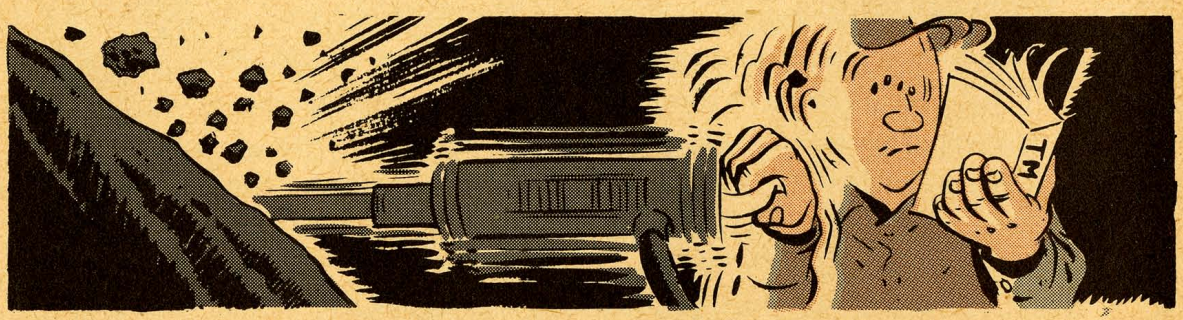
TB's and SB's

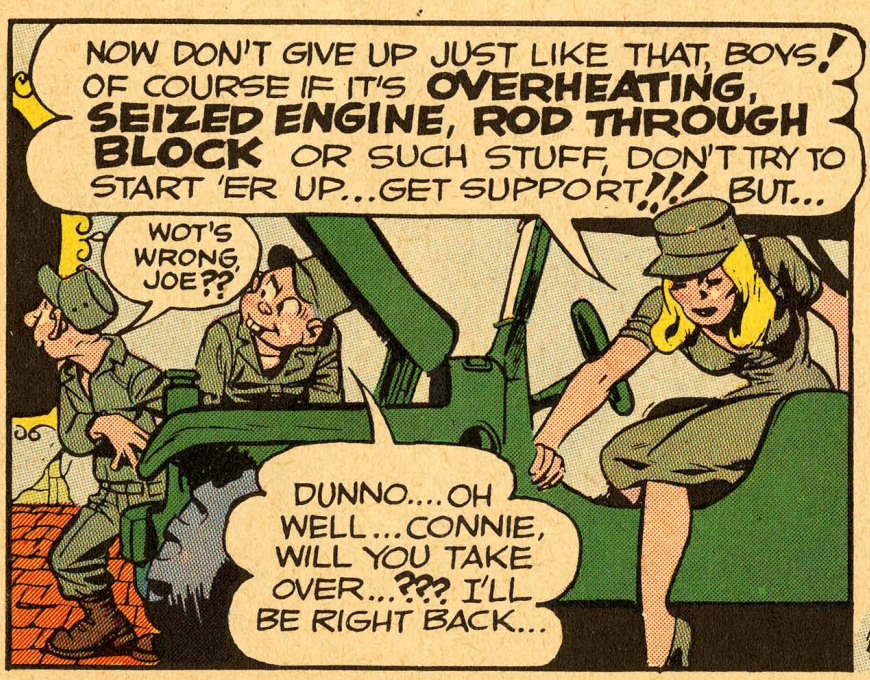
TB 9-314-4, 75-mm rifles T21 and M20: Prev of damage to instr light clamps on scope mt M78, **F,** Oct 54

SB 9-16, Winteriz equip for auto materiel, **D,** Oct 54

SB 9-112, Rep and repl parts for commercial revolvers, **D,** Sep 54

NOTE—On TB's, SB's and MWO's:
O—Organization Maintenance
F—Field Maintenance
D—Depot Maintenance



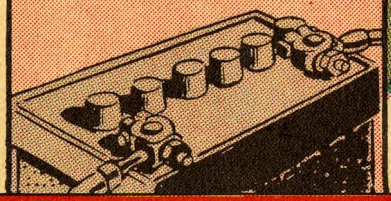


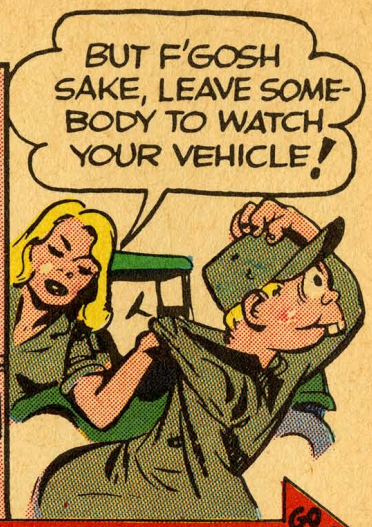
IF YOUR VEHICLE REFUSES TO START FOR NO OBVIOUS REASON . . . AND YOU'RE 'WAY OUT IN THE BOONDOCKS, JUST REMEMBER WHAT IT TELLS YOU IN YOUR DRIVER'S MANUAL (TM 21-305 PARA 100b): "IF IT'S IMPRACTICAL FOR YOU TO MAKE A REPORT USE YOUR BEST JUDGMENT AS TO HOW YOU SHOULD ACT, REMEMBERING TWO CARDINAL PRINCIPLES . . . **KEEP 'EM ROLLING**—AND GET THERE!"

1. STARTER DOESN'T CRANK ENGINE

HEADLIGHTS BURN BRIGHT AND GO OUT WHEN STARTER'S PUSHED? POOR GROUND OR BATTERY CONNECTION!

STARTER AND BATTERY **CABLES** TIGHT AND CLEAN . . . AND STILL NO GO?



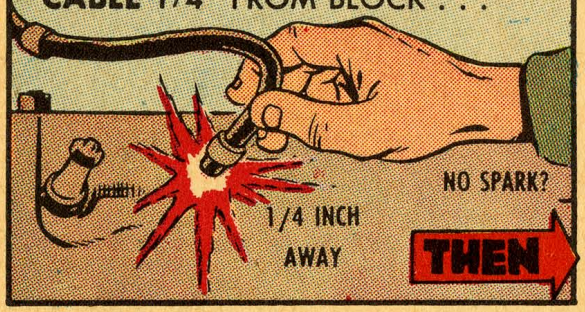


IF BATTERY IS GOOD OR IF STARTER SPINS BUT WON'T CRANK ENGINE: GO GET HELP

. . . OR . . . TRY PUSH OR TOW STARTING

2. STARTER CRANKS BUT ENGINE WON'T START

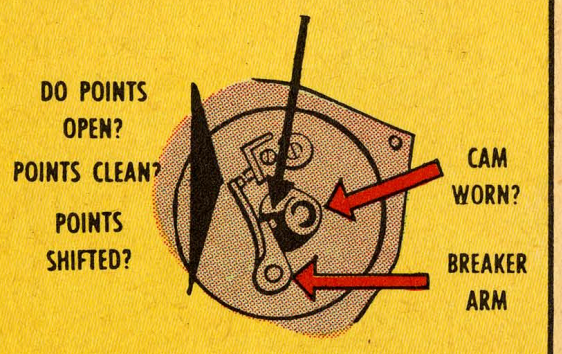
WHILE ENGINE'S CRANKING (IGNITION ON) HOLD **SPARK PLUG CABLE** 1/4" FROM BLOCK . . .



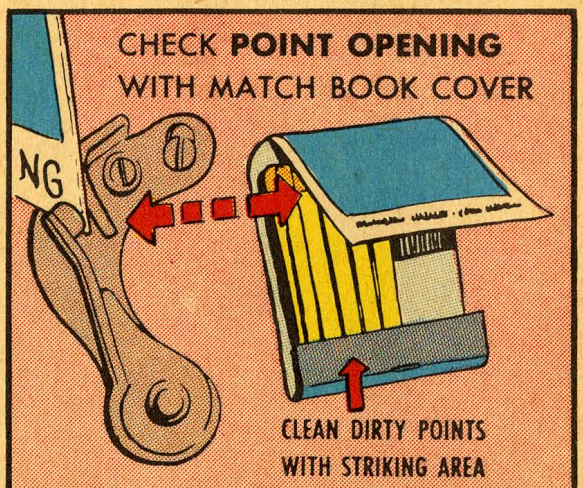
FUEL LEVEL OKAY?
THEN CHECK IGNITION:

IF YOU GET NO SPARK, GO FOR HELP, UNLESS IT'S A **REAL** EMERGENCY. AND A **REAL** EMERGENCY MEANS THINGS LIKE SHOOTING, FLOODS, FOREST FIRE . . . OR A LIFE AND DEATH RUN TO THE HOSPITAL. IT'S **NOT** AN EMERGENCY IF YOU CAN DO IT JUST AS WELL BY PHONE . . . SEE? ANYHOW, IF **IT'S A REAL EMERGENCY** REMOVE DISTRIBUTOR CAP AND ROTOR. MAKE SURE THEY'RE CLEAN AND DRY. THEN CHECK DISTRIBUTOR LIKE THIS . . .

CHECK **DISTRIBUTOR:** TICKLE STARTER **(IGNITION OFF)** TILL **FIBRE BLOCK** (CAM FOLLOWER) RESTS ON HIGH POINT OF **CAM**



CHECK **POINT OPENING** WITH MATCH BOOK COVER



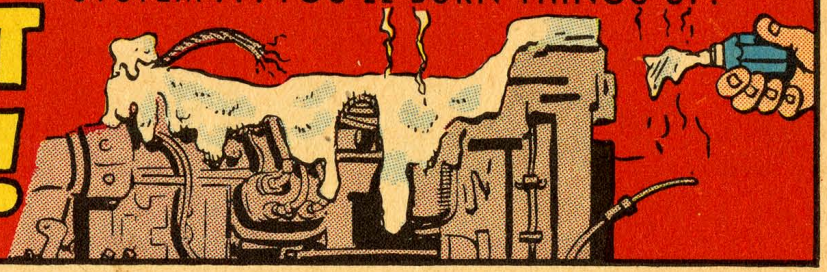
CAREFUL NOT TO LEAVE GRIT BETWEEN POINTS. TAKE TRUCK TO SHOP FOR A CHECK WHEN YOU GET HOME. . .

POINTS OKAY AND NO SPARK?

GO GET HELP!

CAREFUL!

DON'T USE A SCREWDRIVER ON THE 24-VOLT SYSTEM . . . YOU'LL BURN THINGS UP!



3. STARTER OKAY...FUEL IN TANK...IGNITION OKAY

CHECK FUEL SYSTEM

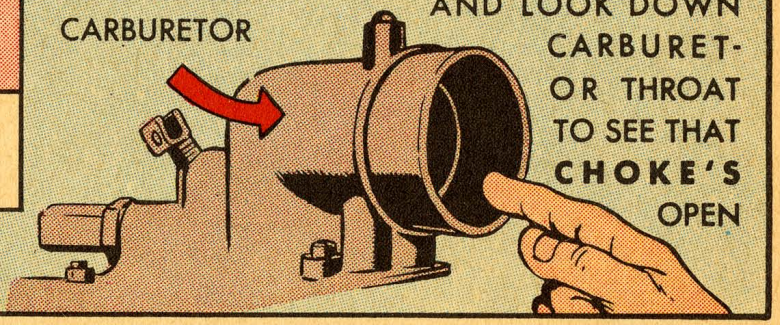
M133 HYDRAMATICS: TURN ON IGNITION (SO FUEL PUMP WILL WORK)

OTHER VEHICLES: IGNITION OFF

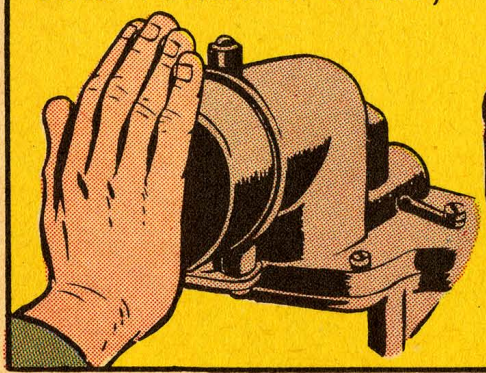
THEN CRANK ENGINE

DOES FUEL REACH CARBURETOR

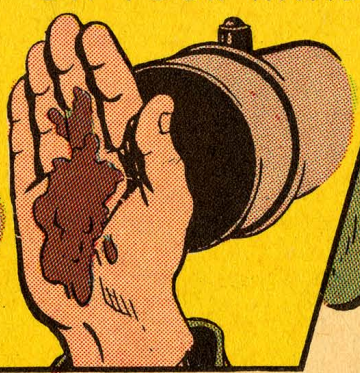
THEN REMOVE **AIR CLEANER INPUT** AND LOOK DOWN CARBURETOR THROAT TO SEE THAT **CHOKE'S** OPEN



COVER **CARBURETOR** WITH HAND WHILE ENGINE'S CRANKED (MAKE SURE IGNITION'S **OFF**)



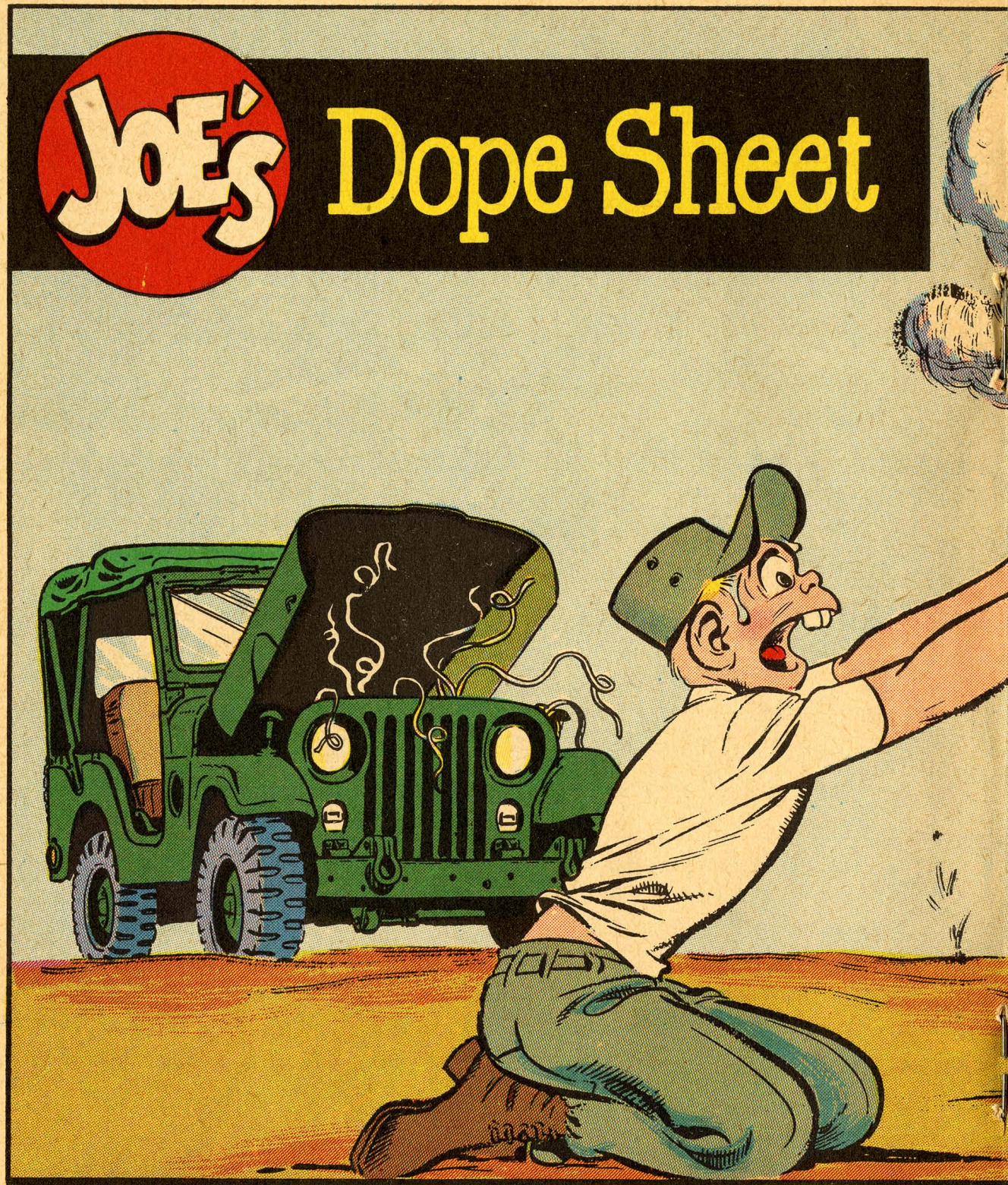
SHE'S **NOT CLOGGED** IF RAW GAS SHOWS IN MANIFOLD AND ON YOUR HAND



SO . . . WITH **THROTTLE** WIDE OPEN TO CLEAR ANY FLOODING, CRANK AND TRY TO START AGAIN.

(CHECK FROM TANK TO CARBURETOR LIKE IT SAYS IN YOUR HANDY TM)

JOE'S Dope Sheet



WE HAVE THE WORLD'S BEST EQU

COPYRIGHT 1955

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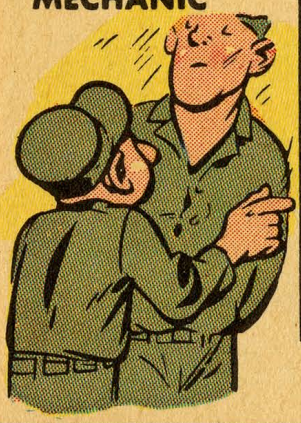
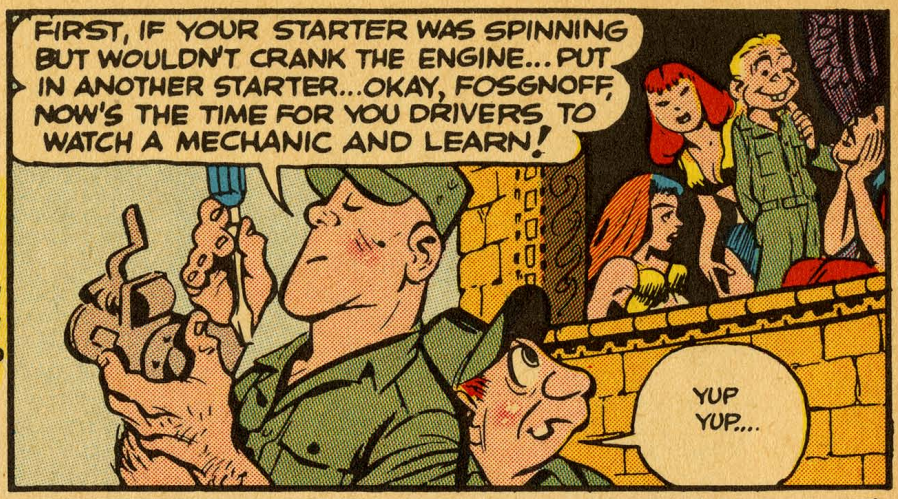
UIPMENT... Take care of it

BY WILL EISNER

IF IT'S STILL NO GO, GET THE **UNIT MECHANIC**



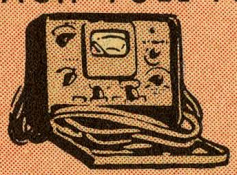


THEN CHECK THRU FUEL AND IGNITION SYSTEMS

FUEL SYSTEM

HYDRAMATICS:

1 DOES CURRENT REACH FUEL PUMP?



USE VOLT METER. . .OR TEST LAMP

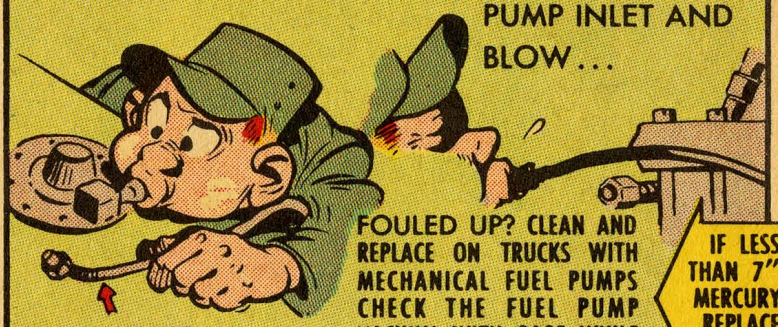
2 REMOVE FUEL LINE AT TANK... CHECK FUEL PUMP OUTPUT PRESSURE

3 REPLACE LINE

ALL OTHER TRUCKS:

1 BLOW INTO GAS TANK. CLEAR?

2 REMOVE FUEL LINE AT FUEL PUMP INLET AND BLOW...



REPLACE LINE

FOULED UP? CLEAN AND REPLACE ON TRUCKS WITH MECHANICAL FUEL PUMPS CHECK THE FUEL PUMP VACUUM WITH GAGE WHILE STARTER CRANKS ENGINE.

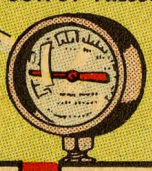
IF LESS THAN 7" MERCURY, REPLACE PUMP

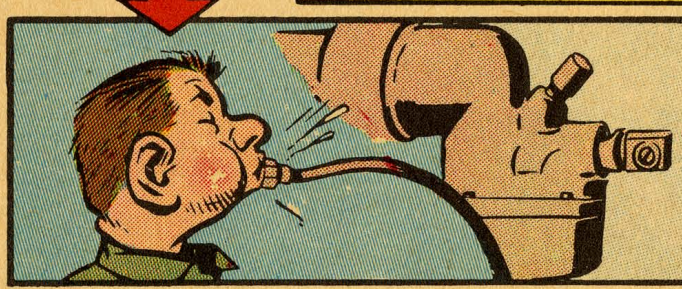
3 REMOVE LINE ON OUTLET SIDE OF FUEL PUMP.

MINIMUM:
3-PSI

NOTE: THIS IS MINIMUM SUCH AS Y'GET WITH THE STARTER CRANKING THE EN—GINE . . . AFTER ENGINE'S STARTED CHECK FUEL PUMP PRESSURE BY TM.

AFTER STARTING ENGINE AS PER TM. CHECK OUTPUT PRESSURE





4 REMOVE FUEL LINE AT CARBURETOR INLET . . . AND BLOW. FOULED UP? . . . CLEAN AND RE-PLACE OR PUT IN NEW LINE.

IF YOUR VEHICLE IS EQUIPPED WITH A MECHANICAL ACCELERATION PUMP, OPEN THE THROTTLE AND OBSERVE THE JET OF FUEL INTO VENTURI! . . . NO FUEL? . . . REPLACE CARBURETOR!

FUEL SYSTEM OKAY?

GET A SPARK?

TRY TO START 'ER UP AGAIN.

IGNITION SYSTEM

ONE BAD HIGH TENSION CABLE CAN GIVE A FALSE TEST. CHECK FOR SPARK AT **TWO OR MORE** CABLES.

1 NO CURRENT AT **PRIMARY CONNECTOR** ON DISTRIBUTOR? . . . REPLACE **IGNITION PRIMARY LEADS** OR **SWITCH** OR BOTH.

2 NO CURRENT AT **+TERMINAL?** . . . CHECK **PRIMARY LEAD.**

ON HYDRAMATICS: CHECK **IN-LINE RESISTOR**

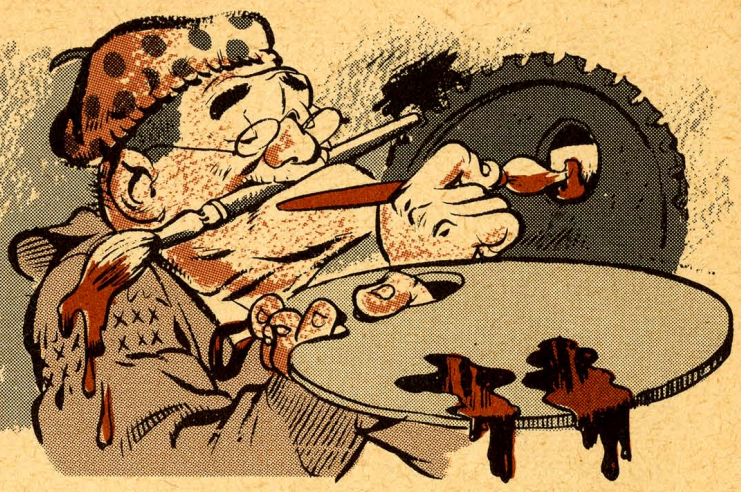
3 NO CURRENT AT **—TERMINAL?** . . . REPLACE **COIL.**

4 **IGNITION POINTS** CLEAN, UNBROKEN AND WORKING?

5 **CONDENSER** OKAY? . . . FOR BEST FIELD CHECK USE NEW CONDENSER.

NOW IF SHE STILL DON'T START, OFF SHE GOES TO THE SHOP FOR A SUPER-CHECK!
THOSE TWO!! ...WHERE'D THEY GO??
GANG WAY!
WHOOEEE!
STEP ON IT, JOE!
PUFF PUFF
HOW SHOULD I KNOW THEY WUZ ALL MARRIED!
WHO SAID THERE WAS SOMETHIN' WRONG WITH IT?
?

SGT. HALF-MAST McCANICK'S ANSWER DEPT.



ON YOUR MARK

Dear Half-Mast,

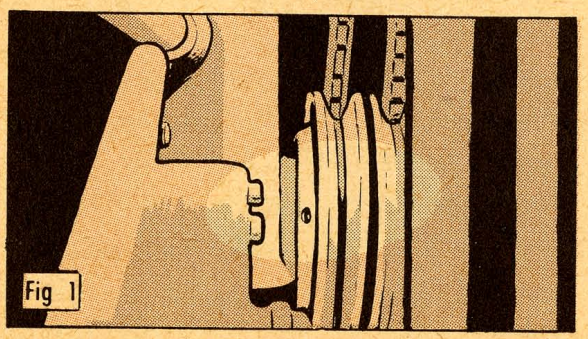
What's what on ignition timing the M38A1 Jeep? It looks like some have no timing marks, and others have 'em but they're hard to see. A few of their older sisters, the '38's, aren't much better off.

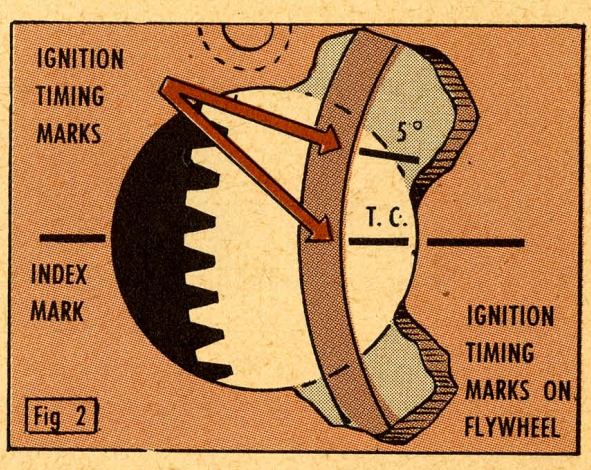
CWO W. J. M.

Dear Mister W. J. M.,

Many a man timing his Jeep may think he's being two-timed—but it's all in how you look at it. Here's the story once-over-lightly.

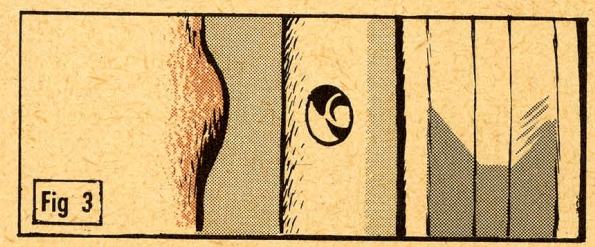
To begin with, except for the very few that got away, all A1's have a timing hole in the crankshaft pulley (Fig 1). These few happened at the change of production, when some left-overs from the early M38's crept into the later 38's and first A1's. The earlier 38's, of course, are timed at the flywheel (Fig 2) and no mark at the crankshaft is needed.





Without a timing hole, all you can do is either exchange the pulley for one with a hole, or put one in. Put it in when the pulley's key-way in the crankshaft is at right-angle to the engine's center-line on the distributor side –where No.1 piston's at top-dead-center.

It's the mark on the timing-gear cover that's got most men snowed. At first, those covers had a boss (Fig 3).



But it's awfully wide and sometimes gets overlooked. The best way for you to see it is from the side—it's easily missed looking at it head-on.

After a few thousand of those, that wide embossment was changed for a simpler one. This consists of two marks, one for Top-Center, and the other for 5° before TC (Fig 4). But the trouble with that one is you got to get down on your hands and knees and look up from

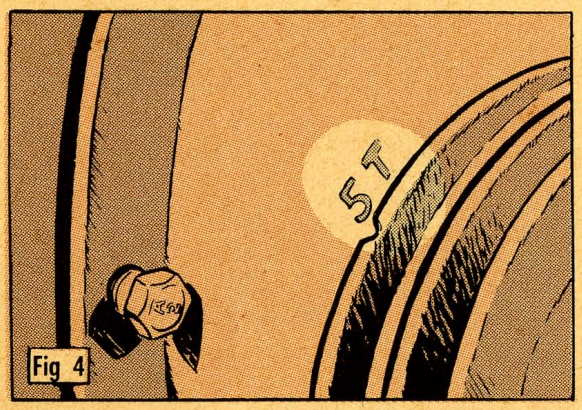


Fig 4

between the axle and the radiator, to see it. Which means it takes two men to time the vehicle—one above, and the other on his hands and knees. Not very handy.

And finally, those coming out now have a double-pointed arrow on their gear cover, one for TC and the other indicating 5° before TC (Fig 5). This metal pointer can't be missed. It sticks out over the crankshaft pulley's hole,

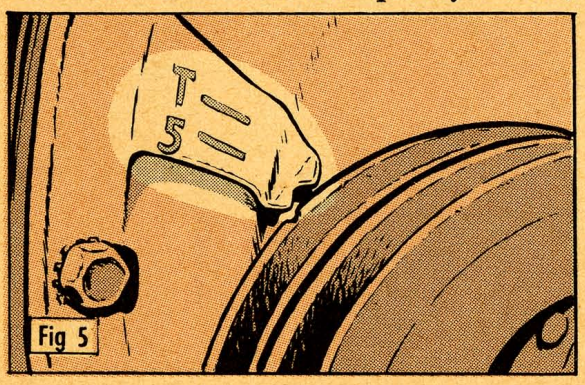


Fig 5

and with it, only one man's needed to time an engine.

The metal pointer should solve the timing problem. MWO Ord G1-W54 puts one on all A1's that have come out without it.

Half-Mast

BOLT REPAIR

Dear Half-Mast,

How is it that the unit artificer isn't allowed to repair a defective bolt on a carbine, and yet parts are authorized in the Ord 7 SNL?

Cpl G. J.

Dear Cpl G. J.,

That was an awkward situation, but it's long gone now. Change 1, FM 23-7 (19 Oct 53) authorized the disassembly of the bolt under the supervision of on officer, non-com, or artificer. Now, since the Ord 7 SNL gives him the tools and the parts, the artificer is all set to make repairs on the bolt.

Half-Mast

PIN-BALL LEVER

Dear Half-Mast,

Has anyone mentioned the spring-loaded ball on the M62 wrecker's front winch clutch-lever? The lever doesn't have a positive stop, goes over too far and lets the steel ball jump out. Can you suggest a fix?

WOJG H. I. G.

Dear Mister H. I. G.,

It's been mentioned all right—between the #$%& and the $%#&. But before the lever can go overboard, its shifter-shaft or keys must've been twisted out of shape. These are what the lever-handle fits on, and they limit its movements.

Always rotate the drum **manually** until the clutch-jaw lines up with the drum-jaw, before you get the winch going. If you don't, the winch'll start with a bang, which lands a sudden wallop on the shaft and keys—that's what causes all the trouble. Ease up.

The latest lever for that truck has a stronger spring behind the ball, and the detent locations on the plate are carefully positioned. Replacing your spring with a heavier one, or stacking light-gage metal spacers behind the one you have, should keep it in place.

Half-Mast

GOT CONNECTIONS?

Dear Half-Mast,

Could you tell me how to connect Cord, light extension, Ord Stock No. 17-C-35081 to the Male Plug, 2-wire, 2-pole, 250-volt DC, 600-volt AC, Mfg Stock No. AL 2606 MP, that came with our 2-1/2-ton, 6x6 ,shop vans—M109 and M220?

Lt F. G. H.

Dear Lt F. G. H.,

That extension cord that you've got is one that was used on the old vans, and it can't handle a full electrical load due to the large voltage drop in the cord (which has only a No. 12 A. W. G. size cable).

If you're going to use it for the lighting load of the van, it will take care of it. Just cut the female end off of the cord, disassemble the plug and solder the cut end of the cord to the two poles of your plug, and you've got it .

Now, if you've got a heavier electrical load than just lights, you'd better requisition these cables. There's a 7-ft one FSN 6150-395-1994 (Ord drawing A-7541319) and a 25-ft one FSN 6150-395-1995 (Ord drawing A-7541320). The short one goes from the generator to the long cable, and the long cable plugs into the truck (unless your generator is close enough for the 7-ft cable to reach the truck).

These cables are not OVM but are with the shop sets.

Half-Mast

STICKERS FOR STICKLERS

Dear Half-Mast,

What's the advantage of using these "PM Service Due" windshield stickers —DD Form 317? Seems to me they only duplicate PM record card files and add confusion. 'Specially when the dates that get put on the stickers don't jibe with those in the card files, as is apt to happen pretty often. Also, I wonder how many drivers ever really give the stickers a second thought.

Sgt V. D. B.

Dear Sgt V. D. B.,

Won't hazard a guess as to how many drivers actually heed these stickers when they're used. All I can say is . . . if they don't, they oughtta.

The main idea is to let the driver help anticipate the next scheduled PM service. It's particularly important where the vehicle's likely to be driven more than 1000 miles in 60 days or 6000 miles in six months. (Hear they're also considered useful during spot checks.)

NEXT 60 DAYS—1,000 MILES OR 6 MONTHS—6,000 MILES

PREVENTIVE MAINTENANCE SERVICE DUE

_____ OR AT _____

(DATE) (MILES)

WHICHEVER OCCURS FIRST

OIL CHANGED _____ MILES

DD FORM 1 DEC 49 317 REPLACES NAVDOCKS 1077 WHICH MAY BE USED GPO 16 61367-1

The driver should remember not only to check the sticker now and then during operation, but to size it up soon as it's put on after each *C* or *D* inspection. Make sure it got the right date and mileage figures to start with. Then, if it should later fail to jibe with card file info, **he'll** know who goofed.

Nothing in the books says these stickers have to be plastered on the windshields of your outfit. But if properly used, they can help a lot to insure against preventive maintenance oversights.

Half-Mast

OIL ADDITIVES

Dear Half-Mast,

What about these products for adding to your oil? Are they any good? And if they are, why doesn't the army issue them? We could save lots of wear and expense on our vehicles if these products do what the advertisements claim they will.

Sgt T. R. B.

Dear Sgt T. R. B.,

Oil additives are one of the most cussed and discussed subjects in the auto game today. Some are some good.

The military procurement people are constantly testing such products, and both the oil companies and the vehicle manufacturers are always looking for ways to make their products better. So you can be sure that they're not overlooking any bets.

But you won't be likely to see any additives for the Army. Those which actually prove helpful will be included in the specifications and put into the oil by the manufacturers. In fact, you are already getting a good many additives, mostly of the detergent type, in your issue oil. And you'll get any new ones in the same way.

So don't worry about them, and don't buy any at your own expense to pour into your GI buggy. What you do with your own car is your business. If you like the pretty girl in the ads, go ahead —it's your hoopy. But remember, the gal doesn't come with the bottle.

Half-Mast

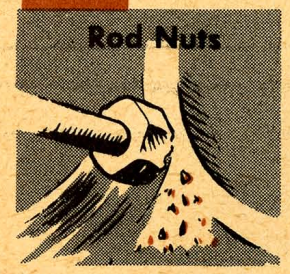
Let's Get—

HEP TO THE CATS

The RCATS, that is. The Radio-Controlled Aerial Targets have come a long way. Today's all-metal beauties do well over 200-MPH, are easy to fly, and have all sorts of parachute and flotation gear in 'em. And bigger and still faster ones are coming.

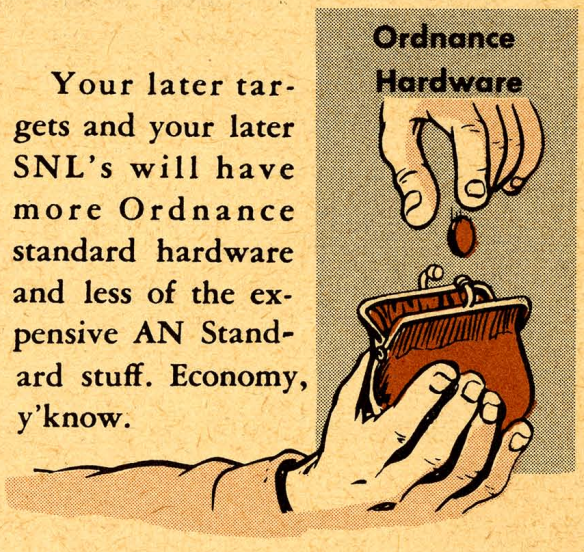
But, as the targets get better and faster, the men taking care of them have to get sharper and sharper, too. So PS has been roundin' up the latest poop for you.

Rod Nuts



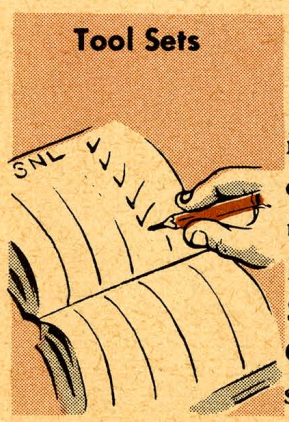
There's been some trouble from using elastic stop nuts on the connecting rod bolts in the 0-100-1 engines. Best thing is to stick to the 6500-482300 (TC-Air) nuts and the 5300-547152 (Ord-Air) special lock-plates. But, if the right parts are not available and you **gotta** use the self-locking nuts, be sure you turn the engine over carefully and see that the bigger nuts are clearing the crankcase all the way around. These big self-locking nuts score the case and let metal shavings into the bearings. That's what all the hooraw's about.

Ordnance Hardware



Your later targets and your later SNL's will have more Ordnance standard hardware and less of the expensive AN Standard stuff. Economy, y'know.

Tool Sets

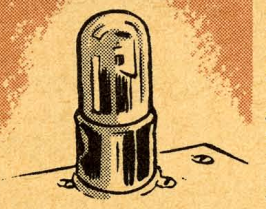


If you're still crying in your beer over maintenance tools, take a quick look at your Ord 6 SNL J-7, Sect 12, October 1953 and see if you have everything listed in the Tool Set, organizational maintenance, radio-controlled target, (41-T-3538-925). That's got it all, from soup to nuts. Also see T/O&E 44-8A.

Classification

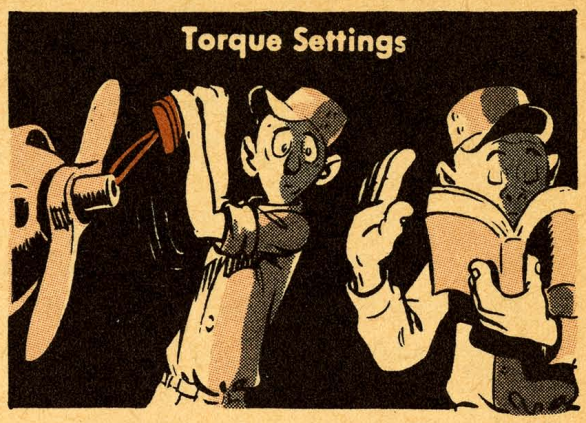
RCATS are now **Y** group materiel. So your new SNL's are Y32 to Y38 inclusive, for targets, launchers and so on. Y70 and Y76 will be along later.

Old Tubes



Lots of electron tubes being replaced are still good. You needn't be hasty in replacing these tubes. Best test any tube before it's replaced. And if you have a tube out of a critical circuit which will not perform within the operating limits, test it. If it tests "good," store it and mark it for use in a non-critical circuit.

Torque Settings



Here's a handy list of torque wrench values for your RCAT:

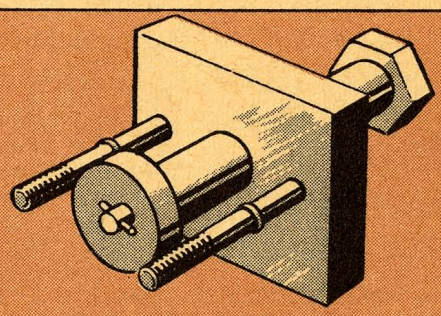
Connecting-rod nuts—100-115 in-lbs.
Prop-hub retaining-screws—960-1080 in-lbs.
Engine mounting bolts—160-190 in-lbs.
Carburetor nuts—50-70 in-lbs.
Fuel pump bolts—50-70 in-lbs.
Center main-bearing cage nuts—50-70 in-lbs.
Spark plugs—26-30 ft-lbs.
Cylinder nuts—15-18 ft-lbs.
Propeller thrust bolts—150-200 ft-lbs.
Magneto mounting nuts—13-16 ft-lbs.
Rear-cover nuts—9-12 ft-lbs.

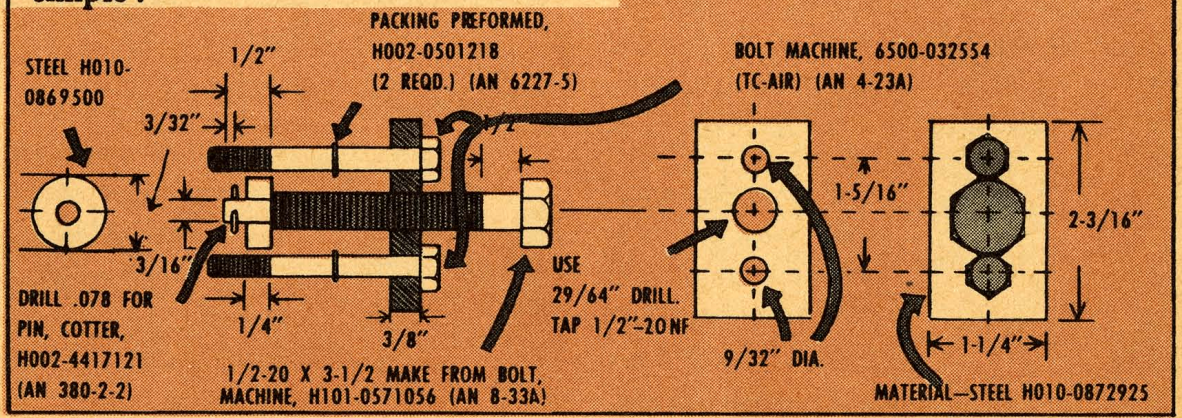
Water in Fuel

Some RCATS've been lost lately from water in the gas. Be sure your system is clean, particularly if your RCAT has been recovered from salt water. (See Raritan Arsenal TIL 2-54, dated 25 February 1954 for dope on purging salt water from engines.)

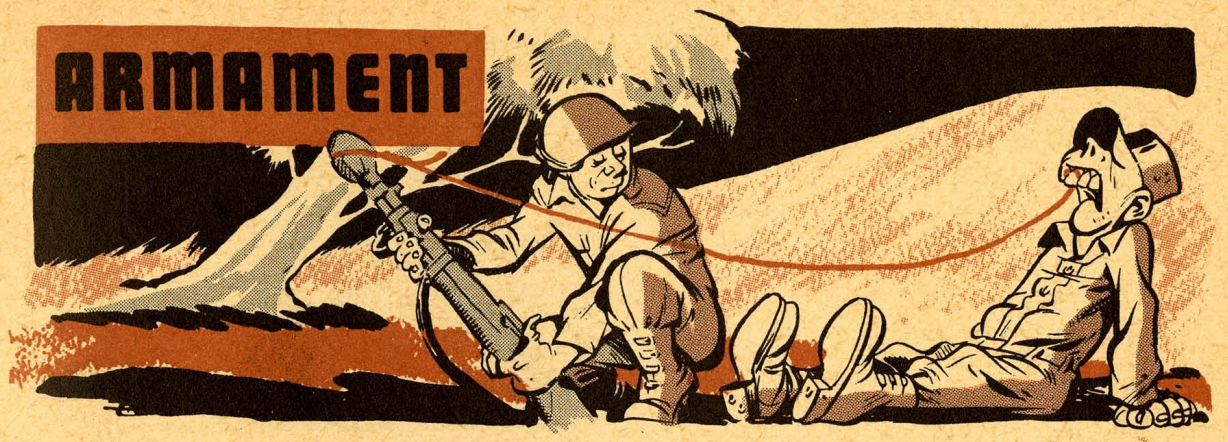
Mag Drive Puller

You can get a magneto-drive-assembly puller under Ord Stock No. 41-P-2941-765. But if you'd rather make your own, here's the drawing. It's simple.





ARMAMENT



TEETH TOO TIGHT

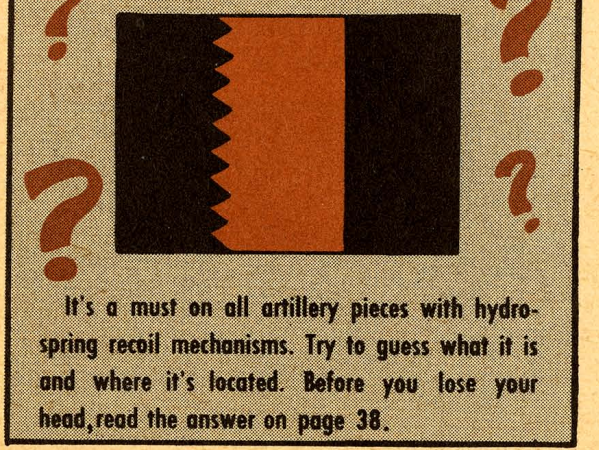
No dentist needed here—just better care of your M1 rifle's rear-sight teeth.

Yessir-e-e, the elevating knob's teeth will wear mighty fast if you screw down the windage knob too tight.

To head that off, here's what to do: Turn the rear-sight windage-knob screw on the pinion until the windage-knob can't be turned—without forcing it. Then back the screw up 1/2 turn (1 click). If the windage and elevation knob are still too tight, you may need to take another half turn.

The elevation and windage clicks should be sharp and distinct, and the settings should not change during firing.

WHATZZIT???



It's a must on all artillery pieces with hydro-spring recoil mechanisms. Try to guess what it is and where it's located. Before you lose your head, read the answer on page 38.

IT'S IN THE BOOK

Man, don't get the wild idea that because your antiaircraft piece has just come back from rebuild that it's all ready to fire. 'Cause the chances are it's not.

The only way you'll know for sure is by checking the gun book. You won't find any red flags flying or warning tags sticking around on the gun to tip ya' off. TB Ord 579 does away with them. Your gun book and **only** your gun book can give you the straight dope.

Some adjustments on your piece have to be done when the weapon is first fired after rebuild; so someone from Ordnance should be on hand to do it. The gun book should be checked for any adjustment dope that may be already in it. O'course, you'll add any new dope.

So keep your itchy trigger finger off that piece until you check and double-check the gun book.

MIX NIX

When you tear down your M1 rifle for cleaning, you'd better make sure you put the same parts back on that you took off. Some other guy's parts may look like yours, but sometimes they're not exactly the same.

Your stock, bolt, operating rod, gas cylinder, and trigger group have been hand-fitted or gaged to fit your piece. That's why they've got to stay together.

Although the parts of the weapons are considered interchangeable, they're not to be changed or switched unless it's done by your Ordnance outfit—they're trained to make your piece behave like it should. So best keep those parts together when stripping it, then you won't run into trouble later.

MOUNT UP...

(By the Numbers)

Getting the right machine-gun mount for your M-series vehicle is pretty much of a snap compared to what it used to be with the old fleet. You have fewer choices and less chance of error.

Here's a run-down of mounts for some of the new trucks as you'll see in Ords 7 and 8 SNL A-55, Sections 16, 18 and 50. There's where you'll find all the dope on the mounts, including which one goes on what vehicle.

	TRUCK	MOUNT
1/4-ton	M38	M31A1
	M38A1	M31C
3/4-ton	M37	M24A3
2-1/2-ton	M34, M35, M36, M48, M49, M50, M60, M44, M45, M46 and 200 series	M36A1
2-1/2-ton	M135 series (Hydra-Matics)	M36A2
5-ton	M41, M52, M54, M62, M55, M64, M61 and M139	M36A1

Your T/O&E will tell you how many and what kind of mounts your unit's authorized. The SNL's will clue you on how to match 'em with the trucks. On the average you'll only have one mount for every four vehicles assigned to your unit.

And how do you get 'em on your truck? Well, you or your mechanic can do that.

HOTTER AND TIGHTER

If the flash hider on your M1919A6 machine gun is suffering from the shakes and the dropsy, here's a sure-fire cure. A new retaining clip (Fig 1) is now available and it'll be the joy of your life. The hotter it gets the tighter it gets. So, watch it, until ya' get one (Ord Stock No. A006-8410172). MWO Ord A6-W15 is your authority—and it's marked **urgent.**

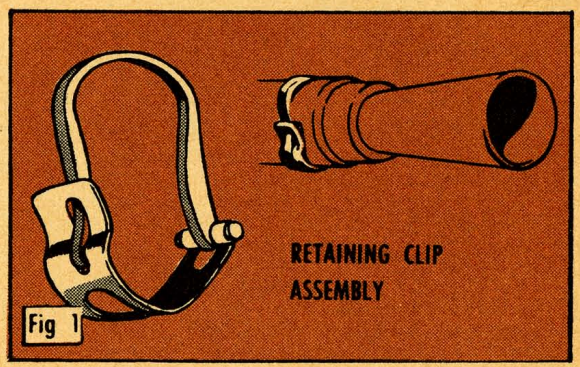


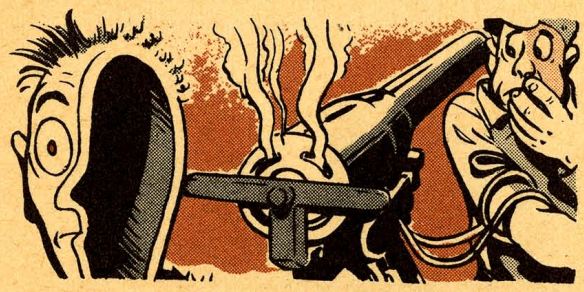
Fig 1

STABLE CABLE

Come, shed a warm, salty tear for Old Joe, the saddest and maddest M27 recoilless rifleman in this here man's Army.

Joe spent an hour and a half jockeying his gun into position and another hour waiting for a chance to sneak one in. And just when he was ready to violate the target . . . **blooey!** He tripped the firing cable with his elbow and shot off prematurely. The target, of course, left in a puff and a huff. And a coupla Joe's buddies won't have to shave for a year.

It doesn't have to happen to you. You can get that firing cable covered and secured so that there's darn little danger of accidental discharge. Ordnance can slip a sleeve over the cable and latch it to the gun so it won't hang loose and snag on whatever's around.



A lot've things will do the job, including Brake tubing. Ord Stock No. G226-6295434; Casing, speedometer, Ord Stock No. G514-7704122; Casing, speedometer, Ord Stock No. G508-7000693; or Shaft, flexible, assy, Ord Stock No. 8240-106300-44 if there's still any around. Takes a piece 34-1/2 inches long.

The new M40 recoilless has this situation all taken care of.

HERE'S A PIN POINT

There're pins—all kinds—safety pins, straight pins, and hair pins, but none can be as much of a trouble-causer as the detent pin in the breech mechanism of your 90-mm AAA gun. You'd better check the alinement of your detent pin with the breech operating shaft. If the pin doesn't lock that shaft, you can expect trouble. When you find that pin out of kilter—don't fire—send an SOS to Ordnance.

KNOW YOUR SKY PRODDER

Before you ask for a new tube for your ack-ack job, make sure it's entitled to it.

If you've got a 90-mm gun M1A2, M2A1 or a 120-mm gun M1A1, you're just wasting your time to ask for a new tube for one of these babies. TB Ord 528 (16 Oct 53) says they're not retubeable.

If you've got a 90-mm gun M1, M1A1, M2 or a 120-mm M1 in need of retubing, better turn it in (the whole thing) and you'll get another piece.

On the 75-mm gun T83E6 and T83E7, 90-mm gun M1A3 and M2A2, 120-mm gun M1A2 and M1A3, you'll find it's a horse of a different color. The tubes can be replaced if they still come under the limits outlined in your TB Ord 528.

You'll have to check your model numbers on the 90-mm gun M1A3, M2A2 and 120-mm M1A2, 'cause they all look alike.

BEWARE C-8 BAKELITE RESIN

Patching the radome on your M33 fire-control system and using C-8 bakelite resin to do the job calls for caution.

The resin contains a material which could be harmful if you get it on your skin or clothes.

If it accidentally gets on your skin, wash the spot for a period of 15 minutes. **Do it immediately**—not later. And if you get some on your clothes, have them washed before you put them on again.

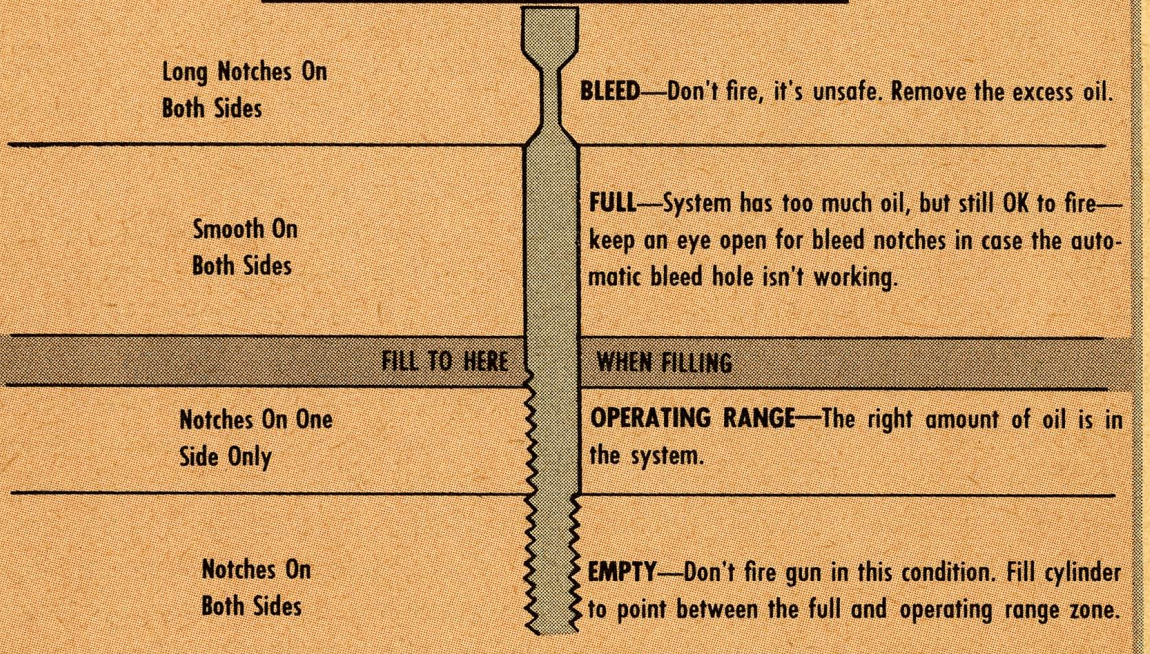
When working with C-8 resin indoors, be sure you've got plenty ventilation. Some people are sensitive to vapors from resin and maybe you're one of those fellas—why take a chance?

WHATZZIT ANSWER

It's the operating range section of the indicator tape that's located at the indicator assembly, or rear end of the replenisher in your hydro-spring recoil system. If the indicator tape shows notches, on one side only, then fire away because there's the right amount of oil in the recoil system. But if notches show on both sides, stop firing, get out your recoil oil and filler gun and fill replenisher thru filler valve until notches are visible on one side of the indicator tape. If you've too much oil in the replenisher, it'll show on the indicator tape first with smooth edges and, when in extremely full condition, a deep notch on both sides of indicator tape. Start bleeding to operational range (saw teeth on one side only) by opening bleeding petcock or (on earlier design replenishers) by pushing in on ball of filler valve gently.

Check the decalcomania warning sign on or near replenishers or the TM for your weapon for more information.

REPLENISHER INSTRUCTIONS



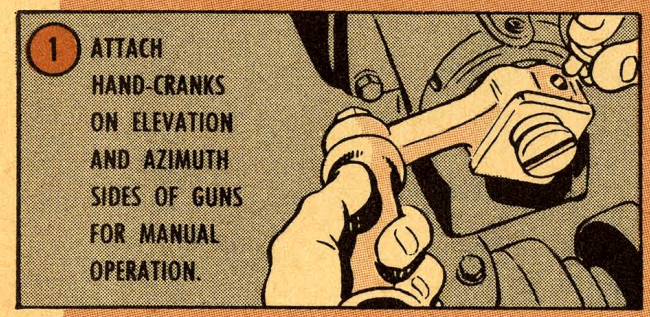
Some Ack-Ack Yak on the M42 and M19A1—

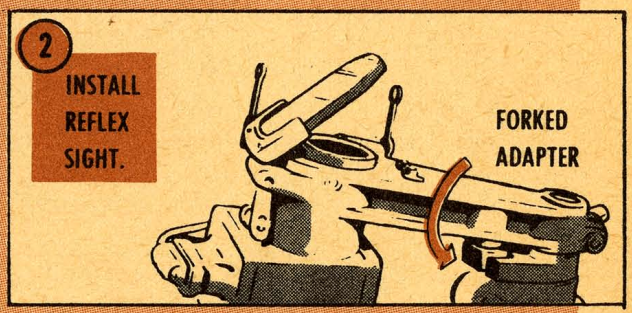
TWIN-40 TUNE-UP

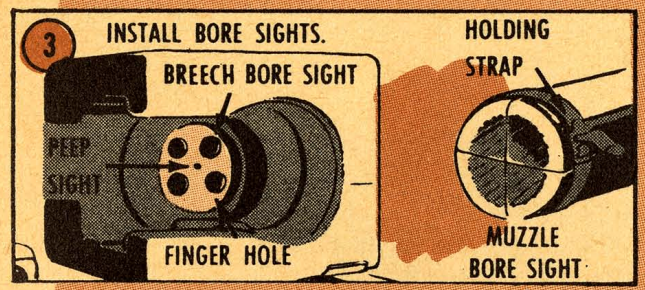
Course, about the safest thing you can have between you and attacking aircraft is a continent or two. But if you're fresh out of these when the buzzer sounds, lay your bets on your M42 and M19A1 self-propelled twin 40-mm guns. They're great little pieces for discouraging strafe-happy buzz-boys.

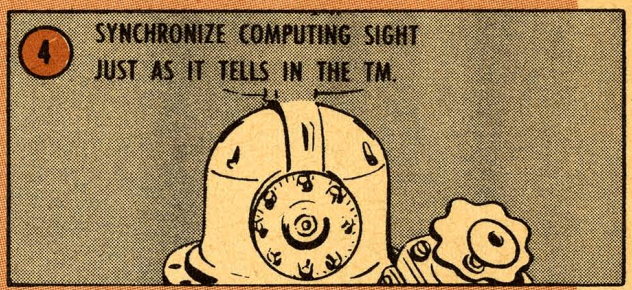
Naturally, you want to know all the angles, so here're a few tips that'll help you boost your batting average when the flak's up and the chips are down.

First, though, you just won't know any angles at all, if your twin-40's aren't synchronized with the elevation oil-gears. Anybody'll tell you the elevation has to be just right if you expect to have any fun with your gun. And there's nothing like synchronization for getting into the swing of things. You have to boresight the gun and synchronize the computing sight just like it tells you in the TM.

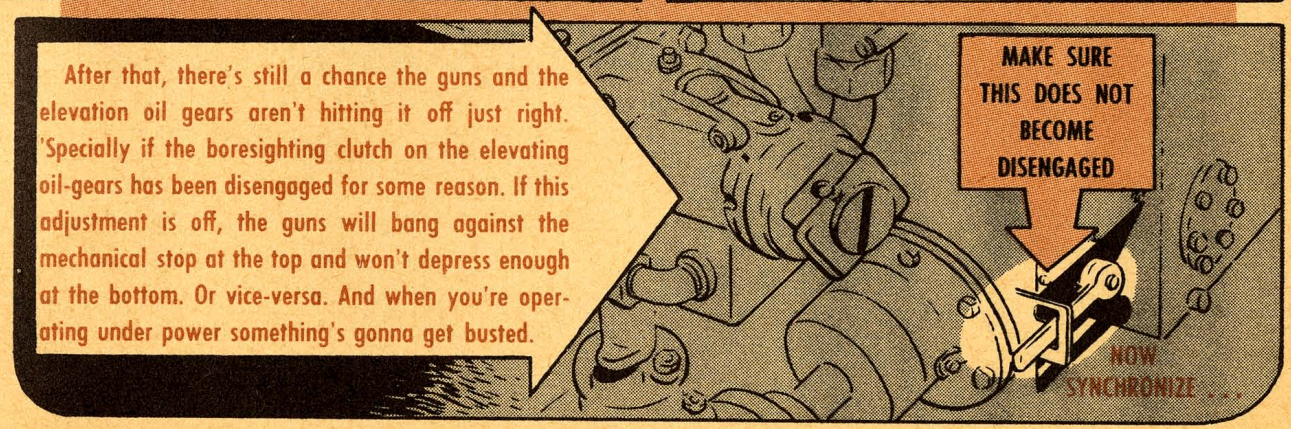


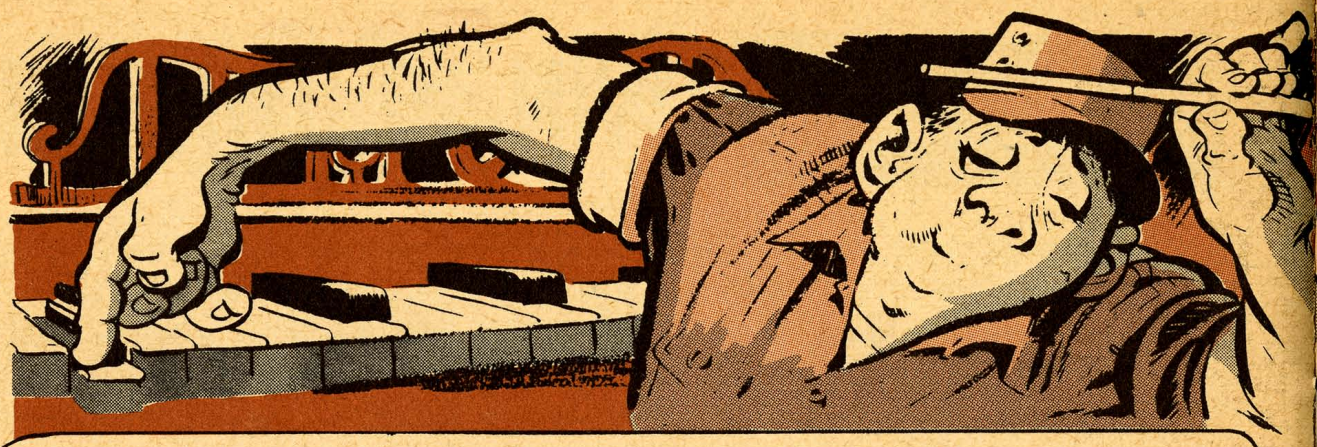






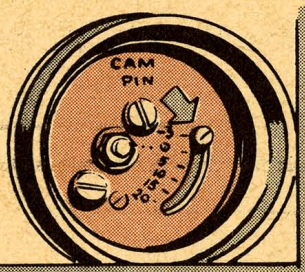
After that, there's still a chance the guns and the elevation oil gears aren't hitting it off just right. 'Specially if the boresighting clutch on the elevating oil-gears has been disengaged for some reason. If this adjustment is off, the guns will bang against the mechanical stop at the top and won't depress enough at the bottom. Or vice-versa. And when you're operating under power something's gonna get busted.





SYNCHRONIZE 'EM THIS WAY:

1 CAMS ON ELEVATION OIL GEAR MUST BE SET AT LOWER LIMIT (–3° to 20°).



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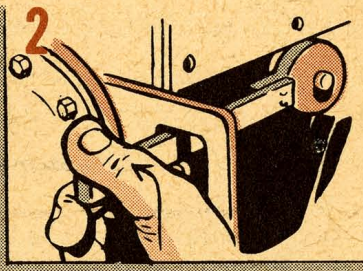
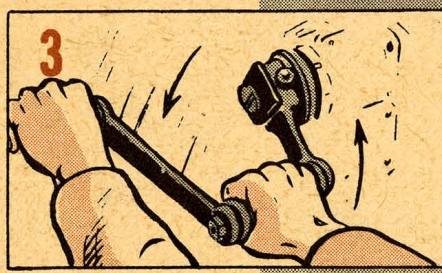


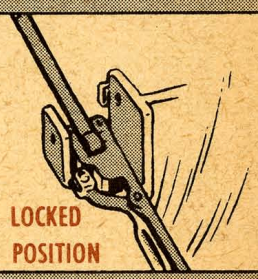
DISENGAGE ELEVATION BORESIGHT CLUTCH BY PULLING LEVER UPWARD OVER DETENT.

3

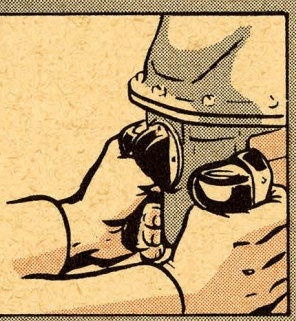


USING HAND ELEVATION CRANK MANUALLY, DEPRESS GUNS TO –3°

4 SET INTERLOCK— TAKE OFF HAND-CRANK AND RAISE DRIVE CONTROLLER. PREPARE FOR POWER OPERATION.



5 ENGAGE ELEVATION-SWITCH LEVER. HOLD DRIVE CONTROLLER HANDLES IN DEPRESSED POSITION TILL OIL GEARS HIT HYDRAULIC LIMIT STOP.



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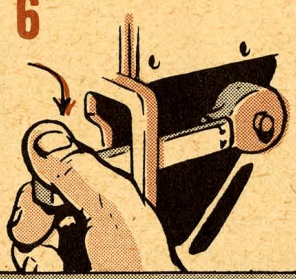
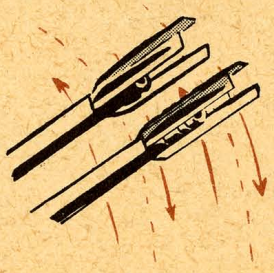


DISENGAGE SWITCH LEVER WHILE STILL HOLDING DRIVE CONTROL HANDLES IN DEPRESSED POSITION. PUSH BORESIGHT-CLUTCH LEVER DOWN INTO ENGAGE POSITION.

7 CHECK ELEVATION UNDER POWER TO SEE IF HYDRAULIC STOPS ARE SYNCHRONIZED WITH GUN. IF NOT—REPEAT THE PROCESS.



8 ONCE GUN AND ELEVATING-OIL GEARS ARE SYNCHRONIZED PROPERLY, THEY SHOULD STAY THAT WAY INDEFINITELY. KEEP BORESIGHT CLUTCH LEVER ON ELEVATION OIL GEARS ENGAGED AT ALL TIMES. AS LONG AS IT IS IN POSITION, YOUR GUNS WILL BE LINED UP WITH THE ELEVATING-OIL GEARS.

SYNCHRONIZE 'EM THIS WAY:

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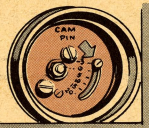
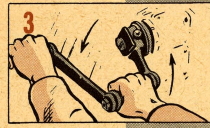


2

DISENGAGE ELEVATION BORESIGHT CLUTCH BY PULLING LEVER UPWARD OVER DETENT.

3 

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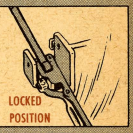

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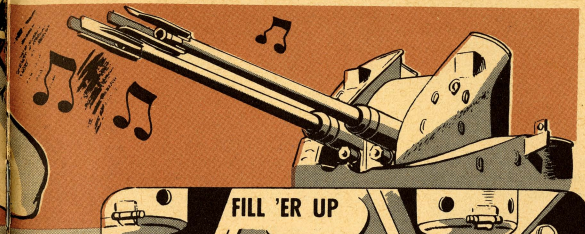
6

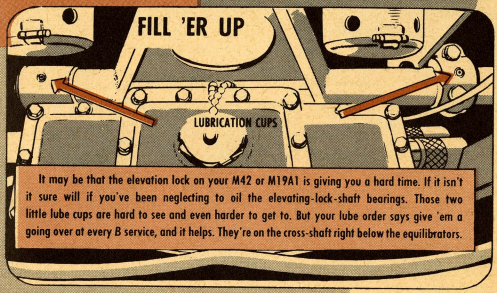
DISENGAGE SWITCH LEVER WHILE STILL HOLDING DRIVE CONTROL HANDLES IN DEPRESSED POSITION. PUSH BORESIGHT-CLUTCH LEVER DOWN INTO ENGAGE POSITION.

7 CHECK ELEVATION UNDER POWER TO SEE IF HYDRAULIC STOPS ARE SYNCHRONIZED WITH GUN. IF NOT—REPEAT THE PROCESS.

8 ONCE GUN AND ELEVATING-OIL GEARS ARE SYNCHRONIZED PROPERLY, THEY SHOULD STAY THAT WAY INDEFINITELY. KEEP BORESIGHT CLUTCH LEVER ON ELEVATION OIL GEARS ENGAGED AT ALL TIMES. AS LONG AS IT IS IN POSITION, YOUR GUNS WILL BE LINED UP WITH THE ELEVATING-OIL GEARS.



FILL 'ER UP

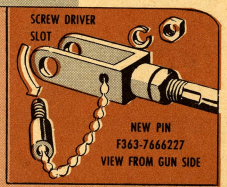


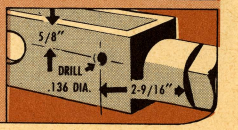
It may be that the elevation lock on your M42 or M19A1 is giving you a hard time. If it isn't it sure will if you've been neglecting to oil the elevating-lock-shaft bearings. Those two little lube cups are hard to see and even harder to get to. But your lube order says give 'em a going over at every *B* service, and it helps. They're on the cross-shaft right below the equilibrators.

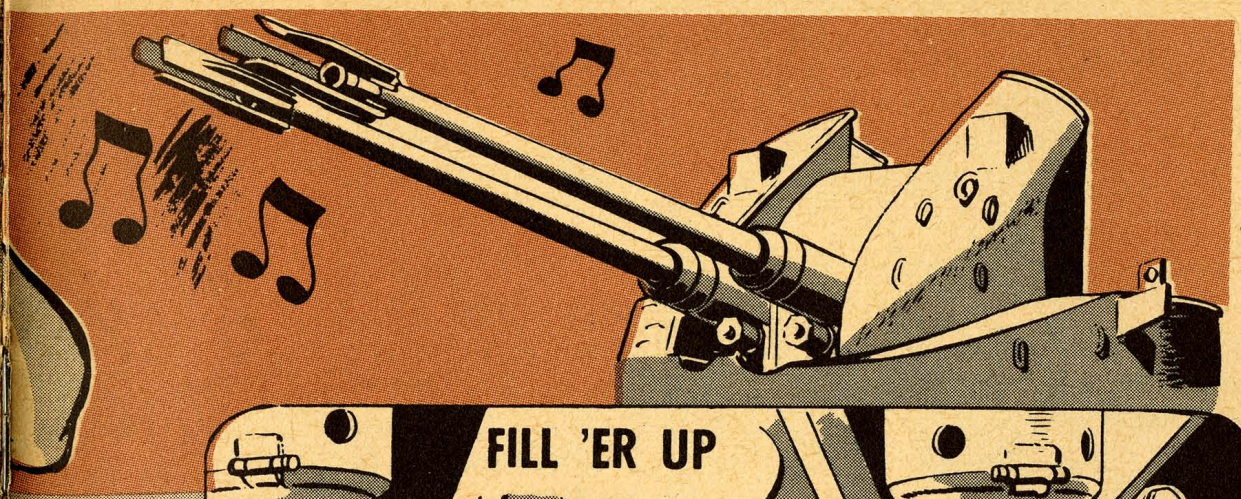
NEW PIN

Groping around for a lost pin (elevating-drag-link rod to gun mount) can be a nuisance. So Ordnance has come up with a new pin (Ord Stock No. F363-7666227) with a hole drilled for attaching a chain (Ord Stock No. 42-C-14155-1). The other end of the chain is attached to the gun-mount side of the clevis. The new pin also has a screw-driver slot on the thread end so you can hold it while tightening the nut.

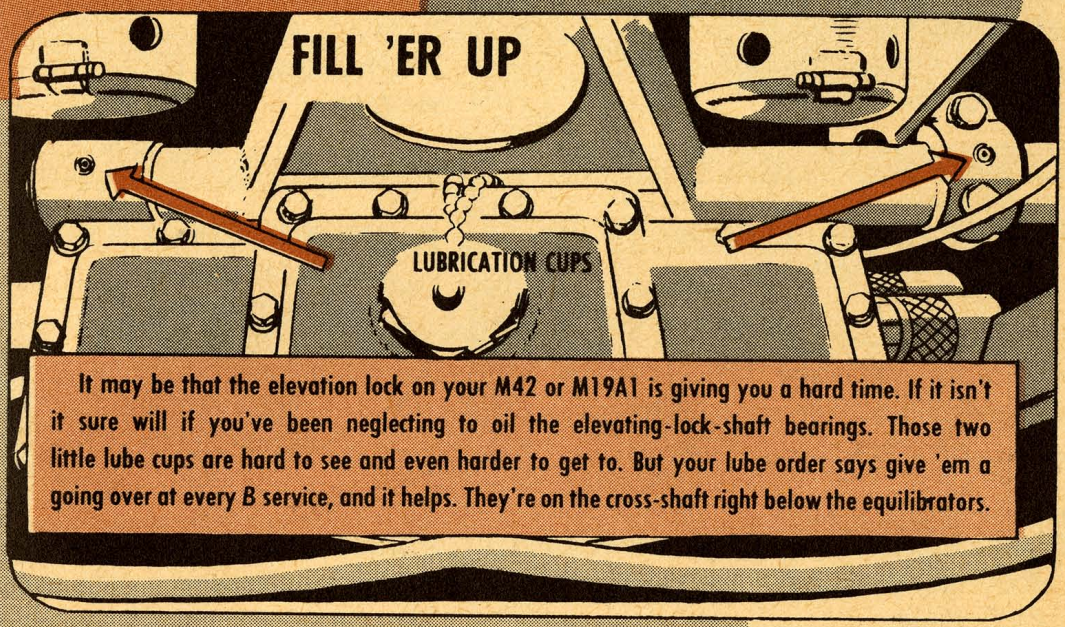
If your M42 isn't up to date on this, get one of the new pins and chains, drill the hole in the clevis, and you can attach the chain—then you're set.







FILL 'ER UP



It may be that the elevation lock on your M42 or M19A1 is giving you a hard time. If it isn't it sure will if you've been neglecting to oil the elevating-lock-shaft bearings. Those two little lube cups are hard to see and even harder to get to. But your lube order says give 'em a going over at every *B* service, and it helps. They're on the cross-shaft right below the equilibrators.

NEW PIN

Groping around for a lost pin (elevating-drag-link rod to gun mount) can be a nuisance. So Ordnance has come up with a new pin (Ord Stock No. F363-7666227) with a hole drilled for attaching a chain (Ord Stock No. 42-C-14155-1). The other end of the chain is attached to the gun-mount side of the clevis. The new pin also has a screw-driver slot on the thread end so you can hold it while tightening the nut.

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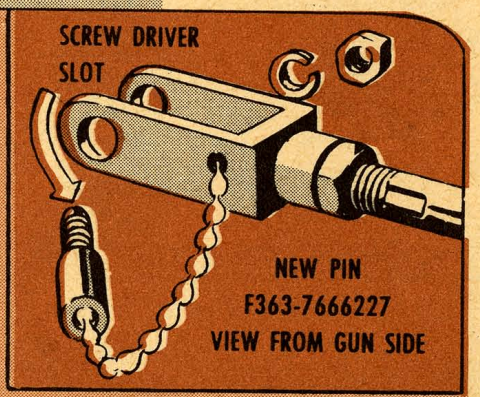
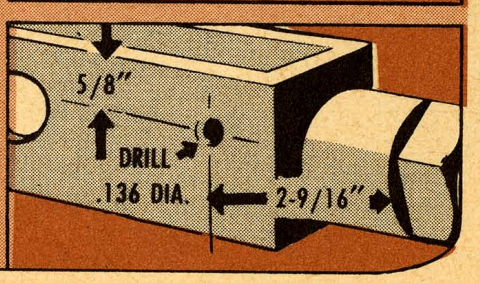
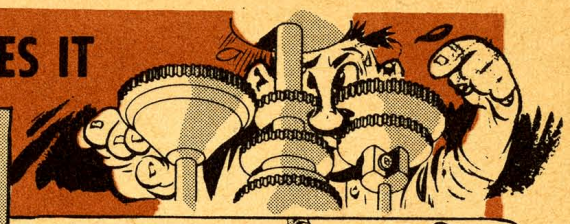


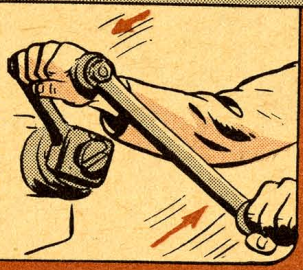


OIL GEARS: E-A-S-Y DOES IT

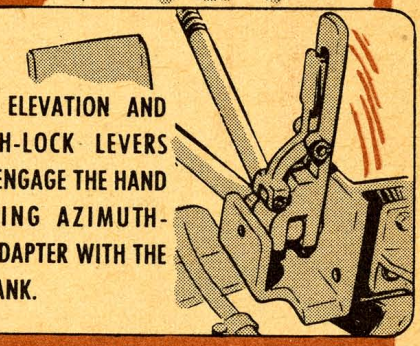


When it comes to starting the oil gears on the M42 you just can't be too careful. Those slewing clutches have to be fully engaged if they're to carry their load. You can't go wrong if you follow these points in starting the gears:

1 PUT ON THE AZIMUTH HANDCRANK AND ENGAGE THE HAND-OPERATING AZIMUTH-CRANK ADAPTER IN MANUAL POSITION.

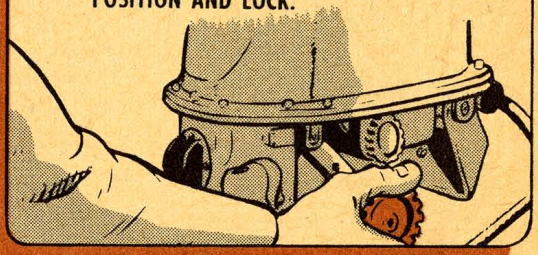


2 UNLOCK ELEVATION AND AZIMUTH-LOCK LEVERS AND DISENGAGE THE HAND OPERATING AZIMUTH-CRANK ADAPTER WITH THE HANDCRANK.

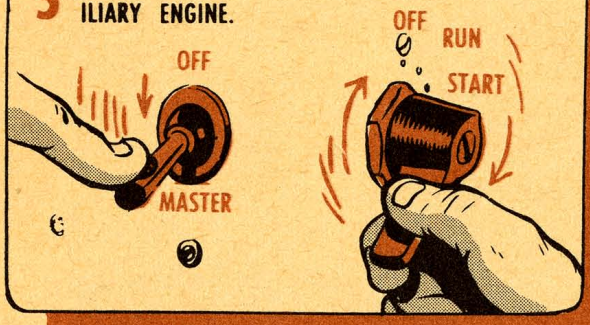


3 LET THE GUN COAST TO A STOP AND THEN TAKE OFF THE HANDCRANK.

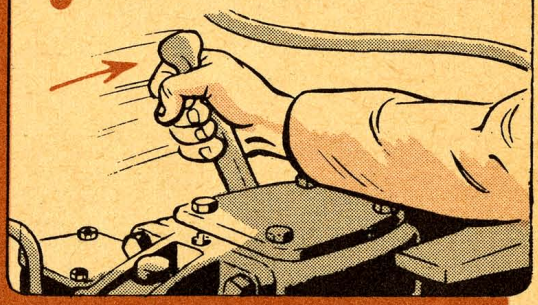
4 RAISE DRIVE CONTROLLER TO OPERATING POSITION AND LOCK.



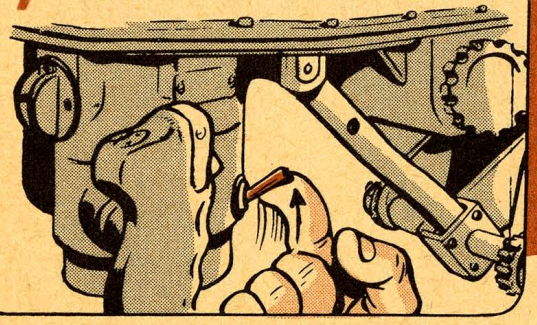
5 TURN ON MASTER-RELAY SWITCH AND START AUXILIARY ENGINE.



6 PULL OIL-GEAR-SWITCH LEVER TO THE REAR.



7 NOW TURN RATE-MOTOR SWITCH TO ON—



If things don't start operating smoothly, start yelling for Ordnance. But turn the power off first.

Now here are two things you never, never do. Never engage the oil gears while the gun mount is in motion. And never re-engage the switch lever to restart the oil gears before they have completely stopped. It'll tear the guts right out of 'em.

STEERING-CLUTCH-LEVER LUBING

Dear Sgt Dozer,

Our D8 came close to some real steering-clutch trouble 'cause two lube fittings located on the right-hand side of the steering-clutch-shaft housing were being overlooked.

There's one fitting on each side of the steering-clutch-control inspection cover, and they're identical to the Alemite fittings on the left side of the steering-clutch-shaft housing (Fig 1).

Thought I'd better clue you on 'em 'cause they're sorta hard to spot. They're located under the hydraulic-control-shaft bracket assembly, and they aren't shown in LO 5-3040-B (4 Dec 53), which goes with our D8.

We didn't wise up to 'em ourselves until the left steering-clutch-lever started acting sluggish and refused to return to neutral position. After a good lube job, the lever started operating smoothly again. Now we're giving the fittings on the right side the same lube care the LO prescribes for the fittings on the left side of the shaft housing.

W. C.

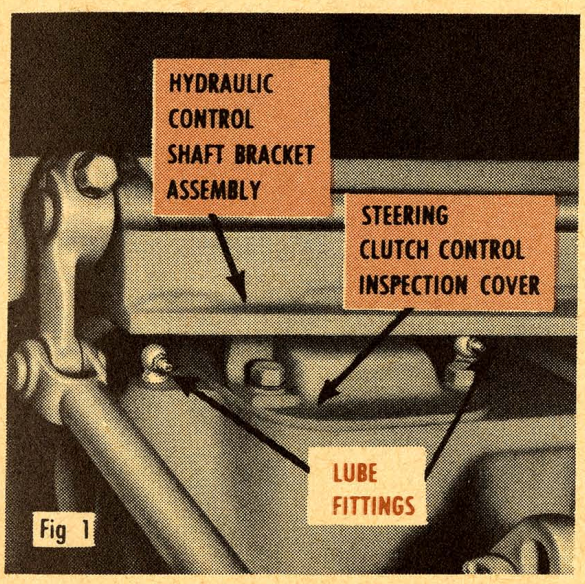


Fig 1

Dear W. C.,

Thanks a million. We're making a handy note about those fittings and calling it to the attention of everybody who uses LO 5-3040-B (4 Dec 53)... which, incidentally, covers D8's with serial numbers running from 2U1 to 2U21513. Effective with 2U21513, there are two fittings on the left side only.

Sgt Dozer

PCU'S DRIVING-CONE INNARDS

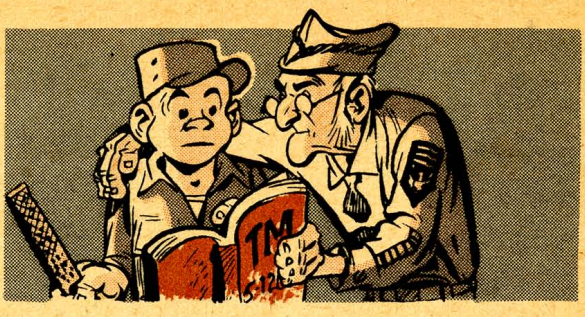
Dear Sgt Dozer,

The tip on cleaning the PCU driving-cone linings (PS 21, page 995) is OK for fibre cone linings, but a metal lining has replaced the fibre linings. This new lining is also available for the master clutch. Fuel overflow doesn't affect 'em.

Old Torch and Filer

Dear Old Torch and Filer,

The "Torch and File" article deals strictly with woven linings. The rasp treatment doesn't apply to the bi-metallic linings on later model PCU's starting in 1952.

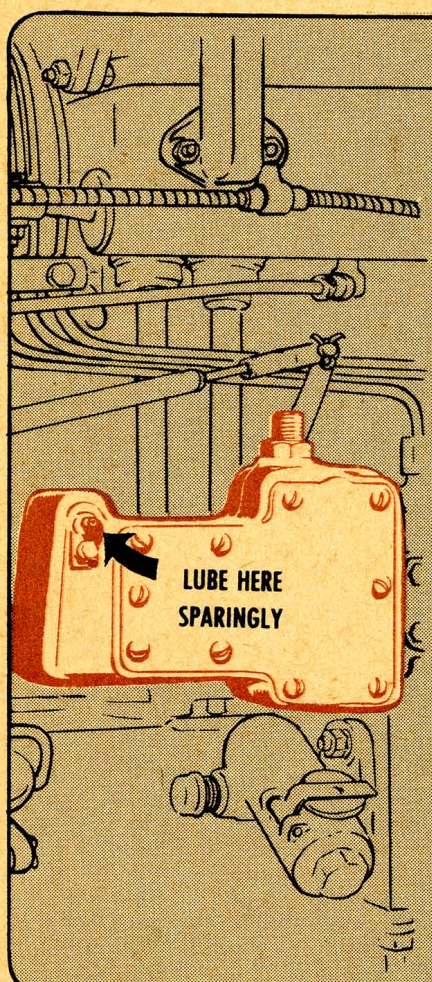


This cleaning tip may be old stuff to most old timers, but please pass it along anyway for the benefit of the not-so-old wrench-jockeys who may be working with not so new equipment.

TM 5-1202 "Trouble Shooting Guide," page 318, gives the rasping facts for woven linings.

Sgt Dozer

MATE YOUR D8 TO ITS OWN LO

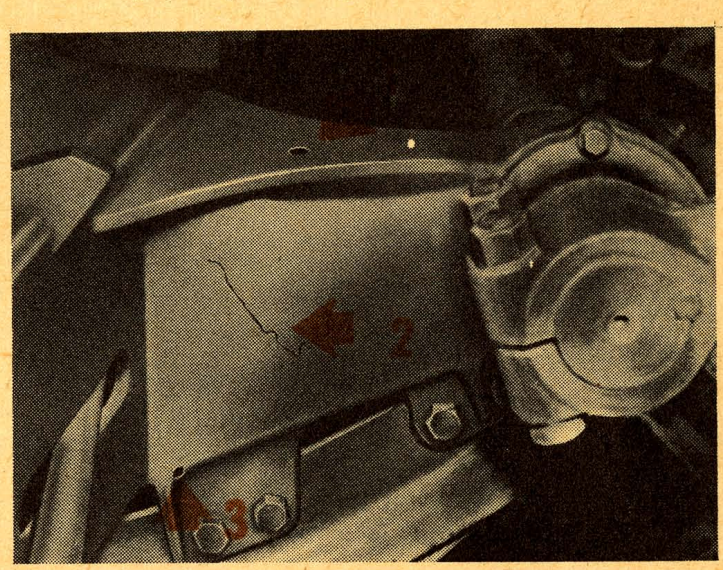


You're likely to skip a vital lube point if you're not lubing your D8 (Serial No. 2U8320 and up) by LO 5-3040-B (4 Dec 53), which superseded LO 5-3040 (4 Mar 52). Some D8's covered by these serial numbers have a lube fitting on the governor housing to take care of the governor control-shaft bearings. The fitting's clearly marked on the LO (and in your D8's manufacturer's manual), but on the D8 it may be hiding under a good coat of paint—so take a close look at the upper left-hand corner of the governor housing. If your D8's got it, lube it sparingly. Some older models don't have this lube point—that's how you can miss it on your new D8 if you use an old LO. Your publications section has the new LO—put in a fast requisition for it if you have to.

TROUBLESOME CAVITY

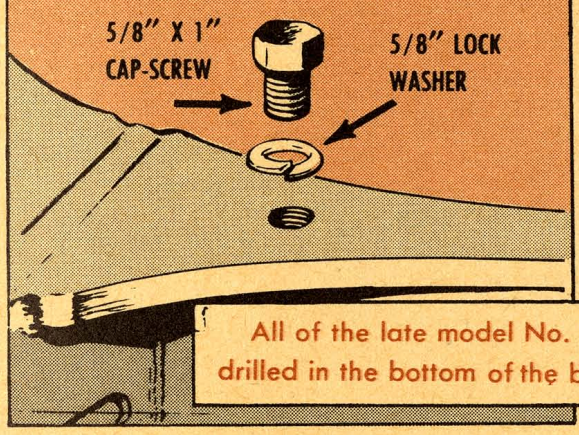
There's one cavity that's got to be filled on that No. 12 Cat motor grader. If you don't keep that hole atop the blade-lift shaft-support-bracket (arrow No. 1) filled up, you're headin' for trouble, 'specially during cold weather.

The hole, used to connect attachments, was originally plugged at the factory. But chances are the plug is long gone by this time. That leaves a hole where rain or snow water can pour into the bracket. Then the trouble starts. The water freezes, expands, and cracks the side of the bracket (like at arrow No. 2).

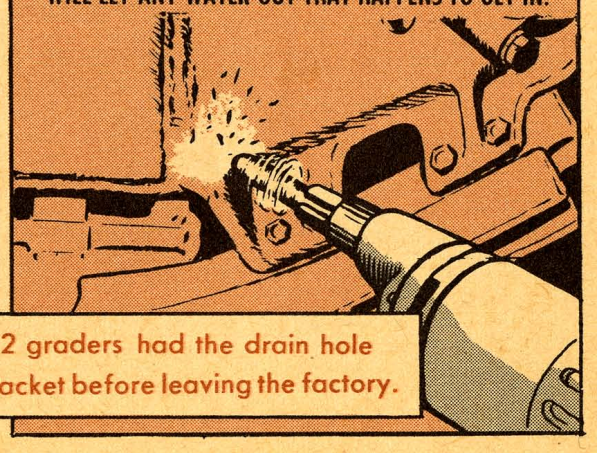


Here's how you can solve the problem:

1. TO MAKE SURE THE HOLE ON TOP STAYS PLUGGED, CLOSE IT UP TIGHT WITH A 5/8 X 1-IN CAP-SCREW AND 5/8-IN LOCK-WASHER.



2. AND JUST TO PLAY IT SAFE, A 1/2-IN HOLE DRILLED IN THE BOTTOM OF THE BRACKET (ARROW NO. 3) WILL LET ANY WATER OUT THAT HAPPENS TO GET IN.



All of the late model No. 12 graders had the drain hole drilled in the bottom of the bracket before leaving the factory.

THE ROUND-UP of Engineer Publications

TM's

5-4251, Grinder, rail, Mall Mod 5043-CG, 29 Mar 54

5-4275, Mach, mortising, Beach Mod 40, 29 Jul 54

5-5339, Comp, air, Kellog-American Mod GE-140, 20 Jul 54

5-2242, Pump, cent., Carter Mod 10 MCW

5-3254, Puller, spike, Nordberg Mod AP

5-5085, Chrgr, batt, Onan Models OTC 33 and 33B

5-5340, Comp, air, Schramm Mod 105

5-5367, Gen set, Kato Mod 52 MPK 4

5-7900, Searchlight, tank mtg, Crouse-Hinds Mod

5-9852-1, Crane-shvl, Thew-Lorain Mod MC-3

5-9852-2, Crane-shvl, Thew-Lorain Mod MC-4

TB's

5-1023-1, Dryer, agge, standard stall type CJ1 Mod 4131

5-4045-1, Digger, clay, Hardsocg Mod CD-25

5-4153-1, Tamper, backfill, Hardsocg Mod BT-32

5-5105-1, Comp, air, Ingersoll-Rand Mod K-500

5-5313-1, Gen set, Master Vibrator Mod EG-107

5-5317-1, Gen set, Master Vibrator Mod EG-105

5-9686-1. Crane, tractor mtg, Cardwell Mod C

5-4114-1, Saw, hack, mtr-drvn, Peerless Mod, 5 Aug 54

5-5049-1, Chrgr, batt, Winpower Mod G-512, 5 Aug 54

5-5385-1, Gen set, Consolidated Dsl Mod 1780, 10 Aug 54

5-5655-1, Gen set, Onan Mod 10HQ-3R/552B, 6 Aug 54

LO's

5-1127, Distributor, water, Butler Mod 6743, 2 Jul 54

5-1260-1 (4 Aug 54), 5-1260-2 (30 Jul 54), 5-1260-3 (3 Aug 54), Crane-Shvl, Bucyrus Erie Mod 37-B

5-5012, Gen set, Hollingsworth Mod JH-3, 18 May 54

5-5049, Chrgr, batt, Winpower Mod G-512, 30 Jul 54

5-5312, Gen set, Hercules Elec Mach & Equip Co. Mod HC-30W-400, 29 Jul 54

5-5368, Chrgr, batt, Onan Mod 2 BH-212E, 19 Jan 54

5-9242-1, Ejector, sewage, Carter Mod BSE-1030, 24 Dec 53

5-9428, Pump, cent, Corman-Rupp Mod 06-H-260, 30 Jul 54

5-9686, Crane, rev, trctr mtg, Cardwell Mod C, 29 Jul 54

5-9776, Mud jack, Koehring Mod 50-2A, 25 Sept 54

5-1081, Tank, asph, Vic Mod 72

5-1164, Distrbtr, Bil mat, Rosco Mod RRE

5-1400-1, Crshr, jaw type, Pioneer Mod 153-PRA

5-1400-2, Crshr, roll type, Pioneer Model 54-VAE

5-1400-3, Conveyors, belt, trnsfr, Pioneer Models

5-1400-4, Dehydrtr, sand, Pioneer Mod 300-WAE

5-1400-5, Pwr ut, crushing and screening plant, Pioneer Mod

5-1400-6, Crshr, roll type, Pioneer Mod 42-VAE

5-1400-7, Scrbbr and wshr, gravel, Pioneer Mod

5-1400-8, Pump, cent., Jaeger Mod 6 PHO

5-2060, Distillation ut, Fairbanks Morse Mod Z

5-5149, Gen set, Buda Mod BD 15A3-CE

5-5236, Engine, gas, Waukesha Mod 195-GK

5-5365, Chrgr, batt, Continental Mtrs Mod 1-244

5-9257, Trk, grbge, Leach Mod, Packmaster

5-9537, Crane-shvl, Amcn Hoist and Derrick Mod 375-BC

MWO's

1026-1, Pump, asph, Littleford Mod US-3C, 12 Jun 54

1142-2, Roller, road, Buffalo-Springfield Mod KT-16, 16 Jun 54

3022-1, Trctr, whl type, Minneapolis-Moline Mod ZAS1, 14 May 54

3378-2, Trctr, crawler type, 15 Jun 54

5166-1, Magneto, Fairbanks-Morse Mod FME6B16, 15 May 54

5313-1, Gen set, Master Vibrator Mod EG-107, 14 May 54

1042-1, Htr, asph, Cleaver Brooks Mod DS

1077-1, Htr, asph, Bros Mod SG-41-T

1142-1, Roller, rd, Buffalo-Springfield Mod KT-16

1520-1, Grdr, rd, Adams Mod 511

5060-1, Comp, air, LeRoi Mod 105GA

5120-1, Wldr, elec arc, Hobart Mod GR-300-S

9508-1, Crane-shvl, Thew-Lorain Mod E-6620

9517-2, Crane-shvl, Gar Wood Buckeye Mod M-20-A

5031-1, Gen set, Hollingsworth Mod CE-51-DC, 30 Sep 54

5357-1, Gen set, Master Mod EG-110, 30 Sep 54

9255-1, Truck, garbage, Gar Wood Mod "Lead Packer," 28 Sep 54

ENG 7 & 8's

1050, Batching, plant, aggregate, Blaw-Knox Mod P3105, 23 Apr 54

1077, Heater, asph, William Bros Mod SG-41T, 25 Mar 54

1183, Roller, rd, Buffalo-Springfield Mod VM-31C, 4 May 54

1305, Loader, agg, N. P. Nelson Iron Wks Mod Q-12TMP, 26 Mar 54

1316, Crane-Shvl, Bay City Mod 65, 20 Apr 54

2007, Pump, cent, Berkeley Mod 2EQLS-28, 26 Mar 54

2051, Pump, deep well, Peerless Hi-Lift Mod 53, 18 Mar 54

2079, Pump, deep well, Johnston Mod 20; Stg 6EC, 5 Mar 54

3003, Trctr, whl type, Case Mod UA1, 20 Apr 54

3476, Truck, dump body, Mack Mod LR, 20 Apr 54

4021, Drifter Drill, pneu, Worthington Mod UMW-400, 10 Mar 54

4059, Tamper, backfill, pneu, LeRoi Mod 11, 3 May 54

4085, Drills, pneu, rock, Worthington Models WJ-55 & WS-55, 20 Apr 54

1029, Mixer, rtry tiller, Seaman Mod TP-84M

1083, Sprdr, agge, Grace Mod S

1101, Roller, rd, Lewis-Browning Mod Pierce Bear S-58

1174, Crane-shvl, Quickway, Coleman & Brackway Mod E

1205, Scrpr, rd, LeTorneau Mod CR

1586, Bulldozer, rigid, Caterpillar Models 6S, 7A, 7S, & 8S

3010, Trctr, whl type, Case Mod LA1

4259, Drill, track, Nordberg Mod CD

5007, Gen set, O'Brien Dieselectric

5019A, Gen set, Homelite Mod 20-5D28-23A

5036, Gen set, Homelite Mod HRA

5038, Gen set, Caterpillar Mod D379

5057, Gen set, Buda Mod DC 100A–3CE

5339, Comp, air, Amcn Brake Shoe Mod GE-140

5380, Gen set, Kohler Mod 2M21

5383, Gen set, Cummins Mod LGA-601-100

5396, Comp, air, Worthington Mod 500 Blue Brute

7900, Srchlght, tank-mtg, Crouse-Hinds Model

8061, Trk cargo, mltry bridging, Perfection Stl Mod

9087, Swpr, rtry, Trctr-mtg, Little Giant products Mod SC-100

9095, Ice plant, Refrigeration Engineering Mod G2000S50D

9098, Plow, Snow, trk mtg, Burch Ross Mod R-23

9634, Crane-shvl, Lima Mod 604

9635, Crane-shvl, Bucyrus-Erie Mod 51-B

9861, Crane-shvl, Lima Mod 802

4092, Breaker, paving, Chicago pneu Mod CP-115, 12 Mar 54

4093, Breaker, paving, pneu, LeRoi Mod 52, 20 Apr 54

5003, Gen set, Bolinders Mod 850, 19 Mar 54

5026, Gen set, Intnl Dsl Elec Mod (Sig Corps Des PE-215-A), 20 Apr 54

5104, Comp, air, American Brake Shoe Mod WG-211-xp, 28 Apr 54

5111, Comp, air, Worthington Models 256 DS, 256 ES, 256 D, 26 Mar 54

5345, Comp, air, American Brake Shoe Mod GE-229-xp, 3 May 54

5447, Comp, air, DeVilbiss Mod UAJE-5103, 9 Sept 54

9047-1, Trailers, 4-whl, 7-ton, flat-bed, pole type, all makes & models, 3 May 54

9099, Cleaning unit, stm, Homestead Mod JO, 20 Apr 54

9230, Crane, non-revolving, trctr-optg, LeTourneau Mod AD-3, 3 May 54

9292, PCU for M-R-S Mod 150 trctr, Bucyrus-Erie Mod P25M, 20 Apr 54

9331, Bucket, clamshell, Blaw-Knox, Size 604-1, 15 Mar 54

9332, Bucket, clamshell, Kiesler Type N, Size 70, 30 Mar 54

9508, Crane-Shvl, Thew-Lorain Mod MC-414, 12 Jun 54

9536, Crane-Shvl, Mich Mod TLDT-20, 12 Jun 54

9818A, Lubricator, Graco Mod 225-155 (Ser Nos. 7137 & up)

9959, PCU for Caterpillar D-4, Mod 44, 28 Apr 54

2016, Pump, cent, Jaeger Mod 2XP, 9 Aug 54

2032, Hypochlorination unit, Wallace & Tiernan Mod A-506, 5 Aug 54

5084, Gen set, Onan Mod CWC4-5S, 20 Aug 54

5184, Comp, air, Curtis Mod Q2B, 2 Aug 54

9082, Sweeper, rtry, Hough Mod K, 2 Aug 54

ENG 7, 8 & 9's

5386, Gen set, Kohler Mod 800M21

5390, Comp, air, Worthington B1 Brute Mod 256E

5397, Comp, air, LeRoi Mod 315-D2-C

6023, Press, lit offset, Harris-Seybold Mod 145A LUD

9089-2, Ice plant, Refrigeration Engineering Mod SG 2000 S50A

9111, Gen, acetylene, Sight Feed Mod TMCP-750

9289, Pwr cntrl ut, Bucyrus Erie Mod P29M

9325, Bkt, clmshll Blaw-Knox No. 724-H

9357, Plow, snow, rtry, William Bros. Mod M-(-275)

9494, Crane, revlvng, crawler mtd, Manitowoc Mod 3900

9553, Auger, earth, Jacques Mod K-254

9632, Crane-shvl, Thew-Lorain Mod TL-25K

9636, Crane-shvl, Orton Mod 32-D

4066, Drill, pneu, Ingersoll-Rand Mod JB-5, 29 July 54

5398, Comp, air, Rix Mod 1262, 19 July 54

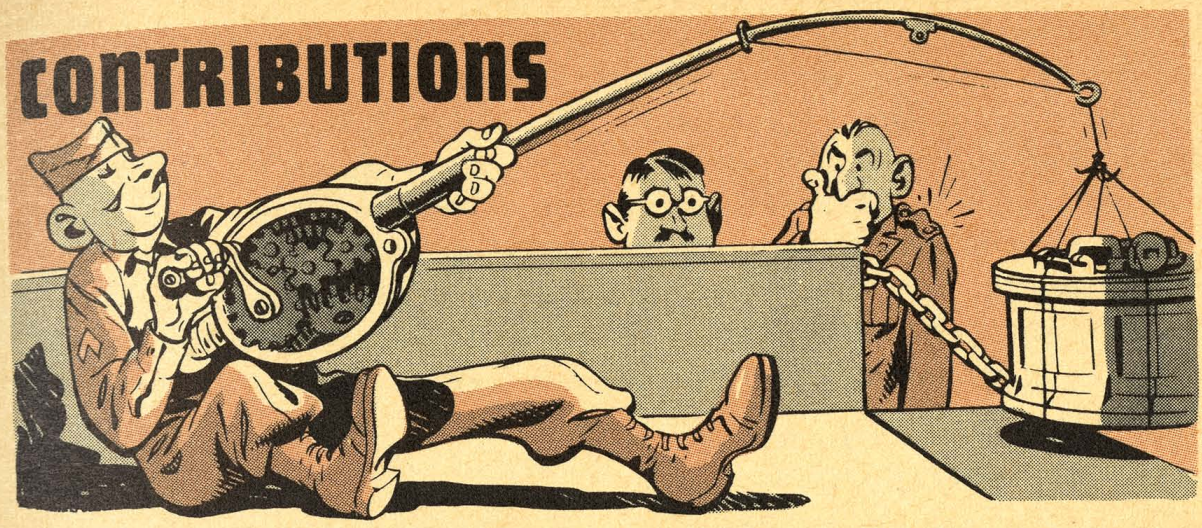
5399, Comp, air, 2 Aug 54

5400, Comp & dryer, air, 30 July 54

SR's

310-20-25, Index of Supply Manuals—Corps of Engineers—15 July 54

CONTRIBUTIONS



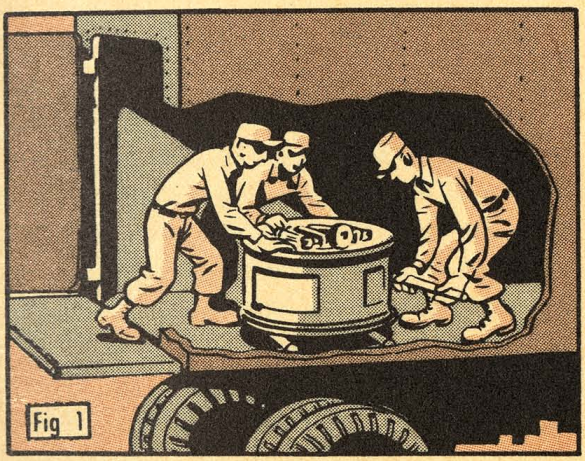
ROLLING YOUR TUBS

Dear Editor,

If you've ever moved the antenna drive unit of an M33 acquisition-antenna, you probably wished there was an easier way to get it in the march order position in the spare parts trailer. There is a way to do it without scraping your shins and straining your back.

The metal sand bag bars which go thru the holes in the jack leg-pads of the antenna mounting-legs make good rollers. You put three of them on the floor of the trailer. Then you put the drive unit on them and roll the unit to its position in the trailer (Fig 1). When you get ready to set up you just roll 'er back out. And you don't tear and scratch up the trailer flooring.

Mr. Paul Smith
Ft Bliss, Texas

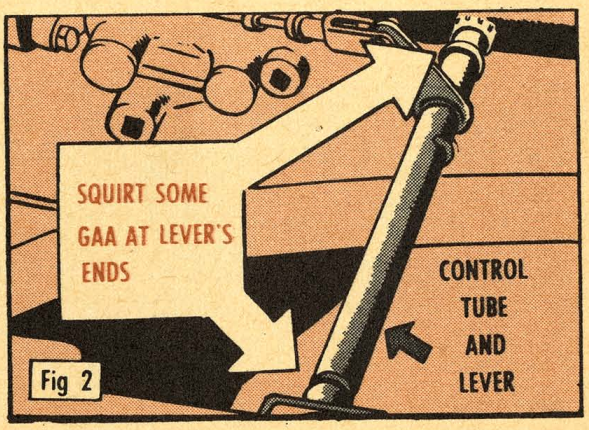


IN ITS CLUTCHES

Dear Editor,

It took a few cases of slowed clutch action and slipping clutches to convince us that the M38 and M38A1 need regular lubing on their clutch levers (Ord Stock No. G740-7372823).

Each of the lever's two ends rotates against a felt washer (Ord Stock No. G503-7371364), that's supposed to hold a film of oil. But the oil dries up—and there's nothing that says to lube them again.



Now when we get the symptoms, we disassemble the lever assembly, clean out any rust, and soak the washers in GAA. And—this is important—every time we lube the vehicle, we also squirt some GAA at the lever's ends for smooth sailing (Fig 2).

Capt J. A. Rickards
Ft Devens, Massachusetts

(Ed Note—We heard of one unit that takes the assembly apart semi-annually, with its D *services, for the clean-up re-oiling job. But squirting the points with a trigger oiler at every vehicle lube should hold it.)*

MACHINE-GUN MOUNT FOR OVERHEAD FIRE

Dear Editor,

We are proud of the safety record for our infiltration course. We have had only one man hurt—and then only slightly by a stripped bullet jacket.

This record is due mainly to the concrete mounts we use for our machine guns on this course. These mounts have an apron which slopes slightly upward from just under the gun muzzle to a point about 1/8 inch below the line of fire, about 4 feet in front of the gun. This apron catches any short or tumbling rounds and ricochets them upwards. It is roughly triangular, and wider than the traverse of the gun. We also use a welded steel-pipe frame, rigidly set into the concrete base, to control the elevation and traverse of the gun (Fig 3).

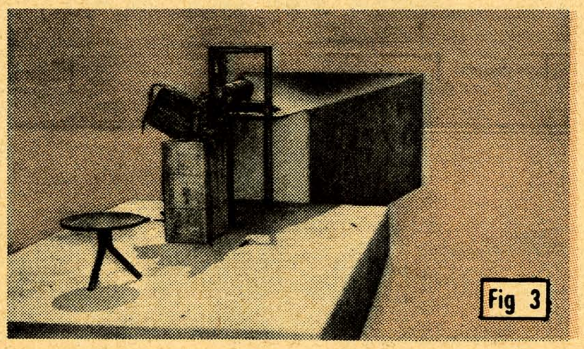


Fig 3

Of course, we are also mighty careful about the condition of the guns we use on this course.

Maj Roy A. Riddle

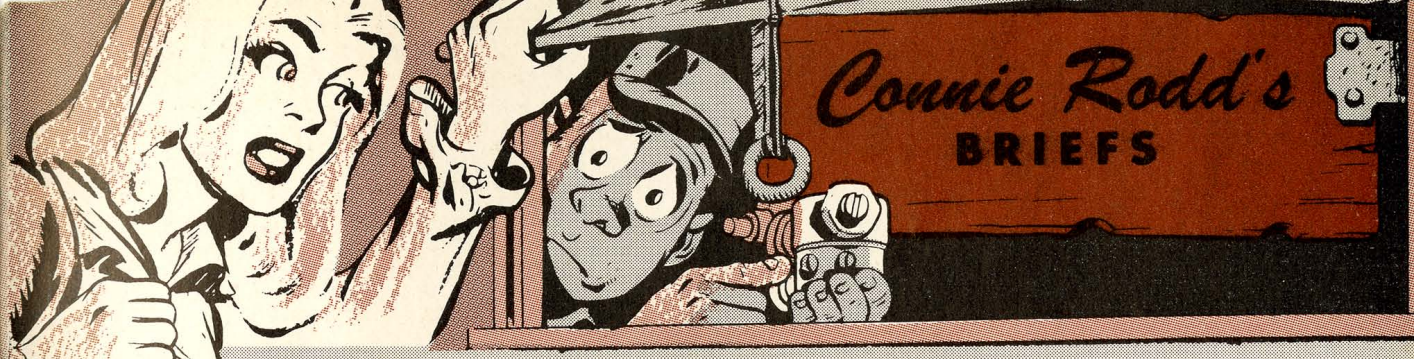
(Ed note—An excellent idea, Major. Your wonderful record proves it. We're sure your men are extra careful about cleaning the weapons daily, checking headspace, and getting Ordnance personnel to check 'em with a breech-bore gage before firing them over the men so as to detect any bore erosion prior to firing—also checking with the breech-bore gage after firing of each 1000 rounds and replacing the barrel if bore is greater than .304 inch as prescribed in SR 385-310-1 with changes. Another sure way to save necks is to keep careful watch on the trunnions, elevating locks, traversing locks and other parts.)

YOUR TRUSTY PENCIL

Got an idea? Trick? Tip? Or some good sound know-how on Preventive Maintenance?

If it'll help somebody else, tell Sgt Half-Mast, and he'll send it along to the people who need it. Give as many details as you can and make rough sketches if they'll help. Don't worry about what you write it on—just whip out your trusty pencil and jot it down—on wrapping paper or whatever's handy.

Then, mail it off to Sgt Half-Mast, c/o PS Magazine, Raritan Arsenal, Metuchen, N.J.



Cylinder on right?

Could be that the oil-replenisher cylinder on your M48 is front rearward. Some of 'em may be on wrong. The indicator tape should be on the loader's side of the gun. If it isn't, turn the cylinder around.

Sling whing-ding

Been hacked for lack of a gadget to swing your M48 or T43E1 tank engines? Unlax. There's a directive out (MWO Ord J6-W1, 28 Aug 54) to fix up Sling 41-S-3832-46 so's it'll handle all the AV-1790's—puts another cable on the sling—making it two on each end. The converted sling becomes 41-S-3832-23. Make sure yours gets the works from Ordnance.

Hic-hic-

You'd better order that alcohol, denatured with a Chemical Corps stock number now—and it is 123786. This will get you a gallon of the stuff.

Descreening an LO

Note 15 of your LO 9-8028 (Nov 53) tells you to remove the filler plug and screen and replenish the oil in your M51 dump's hydraulic reservoir every week. It meant to say remove filler plug, gage and screen; then clean and install the screen. The screen must be in place to filter the oil as you dump it in. LO 9-8028 is being revised to include this dope.

Shear Nonsense

It's shear nonsense letting your 1/4-ton truck's spring U-bolts get clipped riding the rough roads. Those bolts shear if the clip-nuts are too tight or too loose. Torque wrench those nuts to 50-55 foot-pounds—without a reading you could guess wrong.

Easy now . . . easy

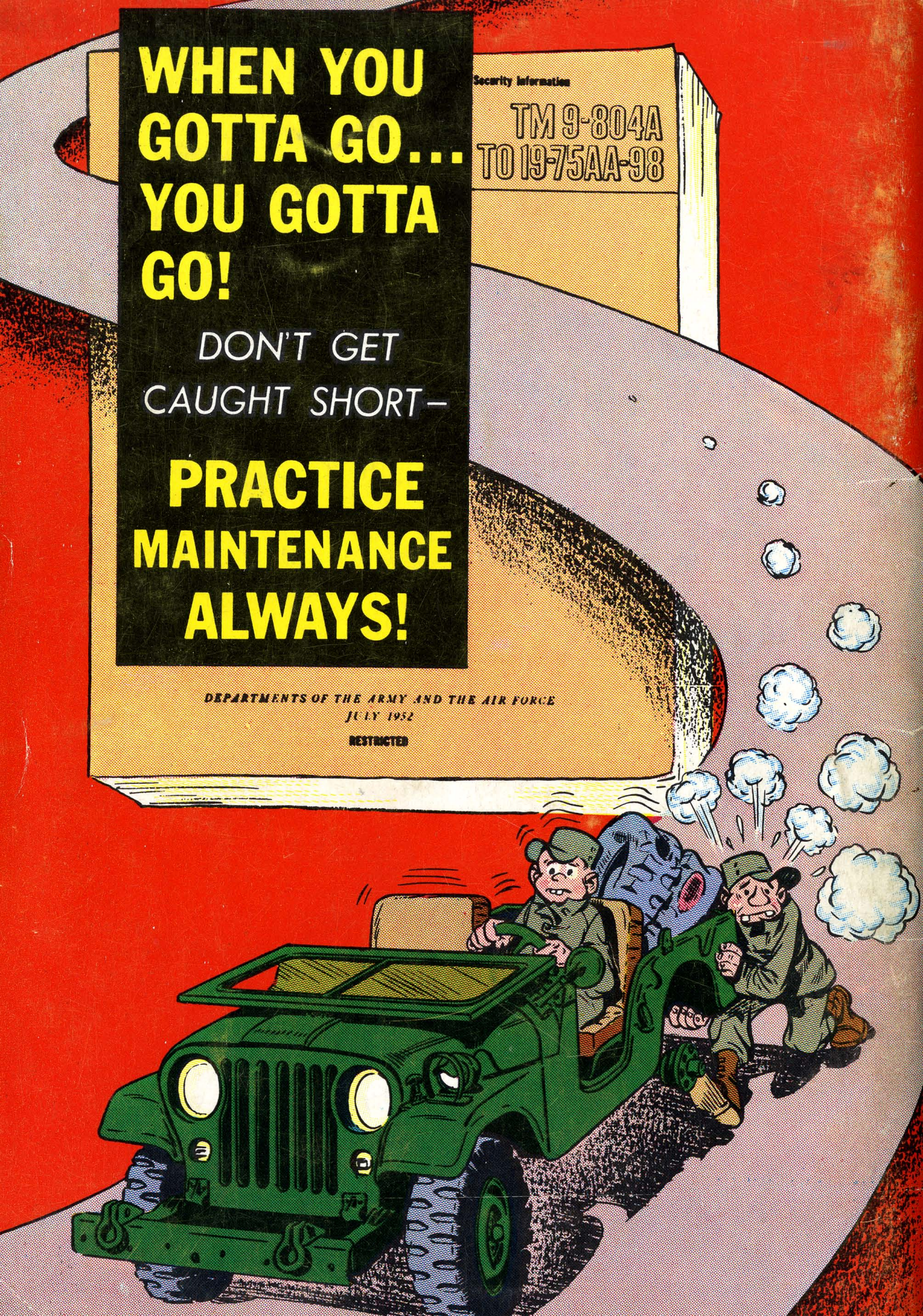
You gotta be more than careful with the range-light cap assembly on the range finder in your M48 tank. Treat it the least bit rough and the bakelite insulator will break. So watch it when you're changing bulbs, will ya?

Easy wash cure

When washing your M34 and M35 trucks, you can avoid trouble by stuffing a rag into the open inlet of your engine air-cleaner. Lots easier than dumping water out of it afterwards. Don't forget it, though.

They're no birdies

Men who ride the back of your truck will save their seat by putting it where it belongs—on a seat or on the floor. If you let them stand, perch on the tailgate or a side rail, they may damage the truck or themselves at the next turn or bump. Tell those passengers it's like cigarette safety—drop 'em where it's safe.


WHEN YOU GOTTA GO... YOU GOTTA GO!
DON'T GET CAUGHT SHORT—
PRACTICE MAINTENANCE ALWAYS!
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